AMATEUR RADIO

VOL 52, No 1, JANUARY 1984

Registered by Australia Post — Publication No. VBH 0569

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

COWELL REPEATER
LF PIONEERS
BUILD AN ELECTRONIC MOUSE
LADDER CRYSTAL FILTERS
JOTA '83 PICS
AR IN KAMPUCHEA
VK CLUB FOSTERS A35
THREAT FROM NUCLEAR BLAST
AOCP SAMPLE PAPER

KENWOOD

PROFESSIONAL ROTATOR

The CT-1000 easily handles up to large HF beams and large VHF/UHF arrays. The good-looking Control Console incorporates an 8-bit CMOS Microcomputer Unit and features a digital azimuth readout accurate to ± 0.5° and a circular LED heading indicator.

$1200

USUALLY ~~$680~~

$640

KR-400
WITH BOTTOM CLAMP

$170

WAS ~~$180~~

TS-830S

Valves are still in!!
(at least in the finals)
Complete with extra set of final valves
worth $35

ECONOMY MODEL
TS-530SP
NOW ONLY $950

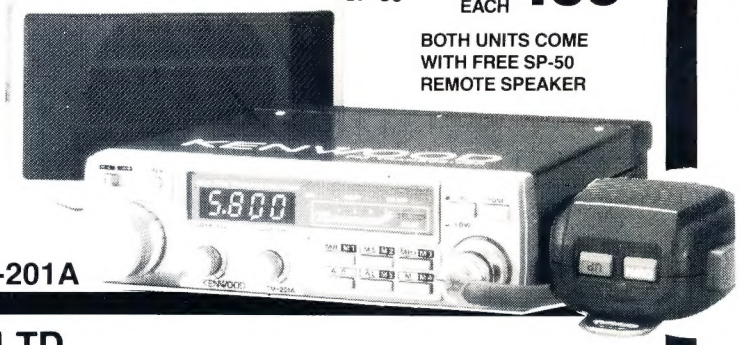
$1100
usually ~~$1150~~

FM MICRO MOBILES

Micro Mini Mobiles for either 2 metres or 70 centimetres. 25 watts on 2 metres or 10 watts on 70 centimetres size — 141 mm wide x 158 mm deep x 39.5 mm High. 5 memories — Scan.

SP-50
$450 EACH

BOTH UNITS COME WITH FREE SP-50 REMOTE SPEAKER



TS-43X HF TRANSCEIVER
Complete with MB-430 and MC-42S

TM-201A

TRIO-KENWOOD (AUSTRALIA) PTY. LTD.

(INCORPORATED IN N.S.W.)
4E WOODCOCK PLACE, LANE COVE, SYDNEY, N.S.W. 2065.
Ph. (02) 428 1455.

Further, beware of dealers not listed in this advertisement who are selling Trio-Kenwood communications equipment. All Kenwood products offered by them are not supplied by Trio-Kenwood (Aust.) Pty. Ltd. and have no guarantee applicable.

NEW SOUTH WALES
TRIO-KENWOOD (AUST.) P/L — 4E WOODCOCK PLACE, LANE COVE (02) 428 1455
EMTRONICS — 758 GEORGE STREET, SYDNEY (02) 211 0531
SPRINGWOOD CAR RADIO — SPRINGWOOD (047) 51 4930
UNIQUE ELECTRONICS — 41B OLD PROSPECT ROAD STH. WENTWORTHVILLE (02) 631 6689
WASSIL ELECTRICAL — 71 SUMMER STREET, ORANGE (063) 62 6249
STOCKMAN & HIGGINS — BYRON STREET, INVERELL (067) 22 1300
ELECTRON 2000 — 3 ELIZABETH STREET, TIGHES HILL, NEWCASTLE (049) 69 6399
MACELEC PTY. LTD. — 99 KENNY STREET, WOLLONGONG (042) 29 1455
RADIO WORLD PTY. LTD. — 81 NEWCASTLE STREET, FYSHWICK (062) 80 6550
E&K COMMUNICATIONS — 14 DUTTON STREET, DICKSON A.C.T. (062) 49 6437
DX ENGINEERING — 5 JASMINE STREET, PORT MACQUARIE (065) 83 2175
LAND LINK — MULLALEY ROAD, GUNNEDAH (067) 42 2838
LAND LINK — 61 BARNES STREET, TAMWORTH (067) 65 4622
FRANK BOUNDY — LISMORE (066) 86 2145

INTERSTATE
VIC: EASTERN COMMUNICATIONS — 168 ELGAR ROAD, BOX HILL (03) 288 3107
BRIAN STARES — 11 MALMSBURY STREET, BALLARAT (053) 39 2808
SUMNER ELECTRONICS — 78 KING STREET, BENDIGO (054) 43 1977
TAS: HOBBY ELECTRONICS — 477 NELSON ROAD, MT. NELSON (002) 23 6751
GELSTON ELECTRONICS — SUMMER HILL (003) 27 2256
WATSONS WIRELESS — 72 BRISBANE STREET, HOBART (002) 34 4303
ADVANCED ELECTRONICS — 5A THE QUADRANT, LAUNCESTON (003) 31 7075
MARINE & COMMUNICATION — 19 CHARLES STREET, LAUNCESTON (003) 31 2711
V.K. ELECTRONICS — 214 MOUNT STREET, BURNIE (004) 31 7733
QLD: MITCHELL RADIO CO — 59 ALBION ROAD, ALBION (07) 57 6830
S.A. & N.T.: INTERNATIONAL COMMUNICATIONS SYSTEMS PTY. LTD. — 8 NILE ST., PORT ADELAIDE (08) 47 3688
W.A.: ARENA COMMUNICATIONS SERVICES — 642 ALBANY HWY., EAST VICTORIA PARK (09) 361 5422
TRI-SALES — CNR NEWCASTLE & CHARLES STREETS, PERTH (09) 328 4160
WILLIS ELECTRONICS — 445 MURRAY STREET, PERTH (09) 321 2207
BAY RADIO — 18 BANKSIA STREET, BUNBURY (097) 21 2236
RON DENT — 115 PATON ROAD, SOUTH HEADLAND (091) 72 1112
SELECT TRONIX — TOM PRICE (091) 89 1564
FORD ELECTRONICS — 209 HANCOCK STREET, DOUBLE VIEW (09) 446 4705

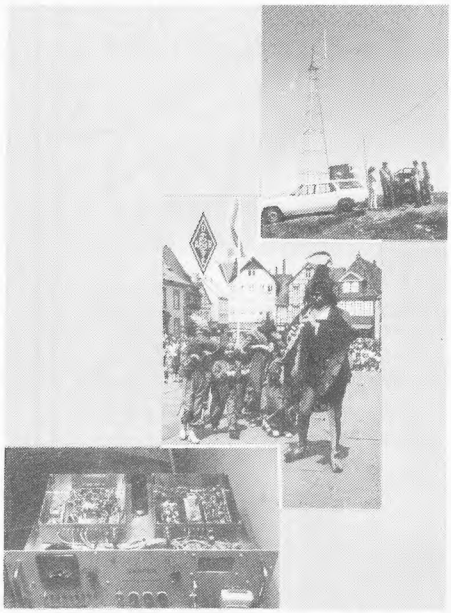
Published monthly as the official journal by the Wireless Institute of Australia, founded 1910.

ISSN 0002 - 6859.

VOL 52, No 1, JANUARY 1984

Registered Office:
3/105 Hawthorn Road,
Caulfield North 3161.
Tel. (03) 528 5962

AMATEUR RADIO



Our cover photographs this month feature the Cowell Repeater (see story p 8) and the Pied Piper of Hamelin (see special award p 50).

CONTENTS

TECHNICAL FEATURES

Electronic Mouse *by Desmond Greenham VK3CO* 15
Experimental Amateur — *Jenny Dipole by Lindsay Lawless VK3ANJ* 14
Ladder Crystal Filters *by Rob Gurr VK5RG* .. 16

REGULAR FEATURES

A word from your Editor 6
Advertisers Index 56
ALARA — *Put a face to the Callsign* 32
AMSAT *Australia* 46
Awards — *Certificate Hunters Club, New & Updated VK Awards & Hamelin Award* .. 50
Book Review — *VHF-UHF Manual 4th Edition & Australian Semi-Conductor Data* 43
Contests — *Results of 7th WA 3.5 MHz CW & SSB tests* 41
Education Notes — *AOCP Sample Paper* .. 44
Equipment Review — *Standard C8900E 2 m FM Txcvr* 10
Five-Eighth Wave 52
Forward Bias 51
Hamads 56
Here's RTTY! — *Simple RTTY Receivers* ... 40
How's DX — *featuring WCY through the eyes of Jim Joyce VK3YJ* 25
Intruder Watch 34
Letters to the Editor 54
Magazine Review 23
National EMC Advisory Service — *EM Pulse Threat from Nuclear Blast* 35
Novice Notes — *The FET* 22
Obituaries — *VK4GC & VK5AMN* 55
Pounding Brass 34
Presidential Comment 7
QSP 17, 19, 31, 33, 43, 53
Spotlight on SWLing 42
Try This — *Alignment Oscillator for 455 kHz by J Heath VK2DVH* 23
VHF UHF — *an expanding world* 38
VK2 Mini Bulletin 52
VK3 WIA Notes 53
WIA News — *Sharing of 50-52 MHz & Vale W4KFC* 6
WICEN News — *Report on SET Exercises* .. 48

SPECIAL FEATURES

Australian Amateur Pioneers on Long Wave *by Jim Linton VK3PC* 13
Ballarat ARC & WCY *by Dick Forrester VK3VU/A35RF* 24
December's Best Photographs 47
Information Technology Week *by Alan VK1KAL* 30
Jamboree on the Air 1983 *by Chris Bentley VK4ABM & Terry Fraser VK3RT* 19
RAAF Signals & Radar Memorial Plaque *by John Allan VK5UL* 31
Reactivation of Kampuchean Amateur Radio *by Mike Watanabe JH1KRC* 20
TV Interview — *Theme Amateur Radio by Neil Penfold VK6NE* 17
VHF Communications Subs for 1984 23
VK5REP: *The Cowell Repeater by Brian Warman VK5BI* 8
Win A KB Noise Bridge 31

DEADLINE

All copy for March AR must arrive at PO Box 300, Caulfield South, Vic 3162 at the latest by the 25th January 1984.

EDITOR
GIL SONES* VK3AUI

TECHNICAL EDITORS
RON COOK* VK3AFW
PETER GAMBLE * VK3YRP
EVAN JARMAN* VK3ANI
BILL RICE* VK3ABP

CONTRIBUTING EDITORS
MIKE BAZELY VK6HD
RON COOK* VK3AFW
REG DWYER VK1BR
BRENDA EDMONDS VK3KT
MARSHALL EMM VK5FN
RON FISHER* VK3OM
BRUCE HANNAFORD VK5XI
ROY HARTKOPF* VK3AOH
ROBIN HARWOOD VK7RH
COLIN HURST VK5HI
ERIC JAMIESON VK5LP
MARGARET LOFT VK3DML
KEN McLACHLAN VK3AH
LEN POYNTER* VK3BYE
TONY TREGALE VK3QQ

DRAFTING
GEORGE BROOKS
LIZZ KLINE

BUSINESS MANAGER & SECRETARY
REG MACEY

ADVERTISING MANAGER
JOHN J A HILL VK3WZ

***Member of Publications Committee**

Enquiries and material to:
The Editor
PO Box 300, Caulfield South Vic. 3162

Material should be sent direct to **PO Box 300, Caulfield South Vic., 3162,** by the **25th of the second month preceding publication. Phone: (03) 528 5962.** Hamads should be sent direct to the same address.
Acknowledgement may not be made unless specially requested. All important items should be sent by certified mail. The editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying a reason.

Trade Practices Act: It is impossible for us to ensure that advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that the provisions of the Act are complied with strictly.

Victorian Consumer Affairs Act: All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business or residential address of the box-holder or seller of the goods.

Production: BETKEN PRODUCTIONS
5 Masefield Avenue, Mooroolbark, 3138.

Laser Scanned Colour Separations by:
QUADRICOLOR INDUSTRIES PTY LTD,
Graphic Division
22-24 Glenvale Crescent, Mulgrave, 3170.
Tel.: (03) 560 2222

Typesetting by: QUADRICOLOR INDUSTRIES PTY LTD,
22-24 Glenvale Crescent, Mulgrave, 3170.
Tel.: (03) 560 2222

Photographic film and processing material courtesy AGFA-GEVAERT LTD AUSTRALIA

Printers: WAVERLEY OFFSET PUBLISHING GROUP
Geddes Street, Mulgrave, 3170
Tel.: (03) 560 5111

OVER 33,000 CHANNELS

JIL SX-200

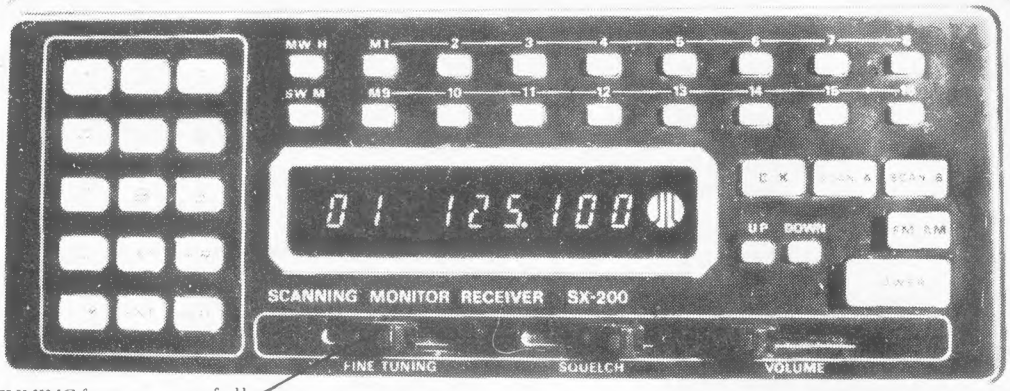
GFS electronic imports

JIL REGD TM

Monitors thousands of frequencies including the AIRBAND and Australian Low-VHF band.

■ Now available, 32 Memories and auto AM on CB/MARINE and AIRBAND.

NEW RANGE OF ACCESSORIES See over.



A range of accessories is available including Broadband or High Gain BASE Antennas.

■ FINE TUNING for coverage of all Australian channels on VHF Low.

THE ONLY SCANNER THAT GOES 26-88, 108-180 & 380-514 MHz

SPECIFICATIONS

- **Type:** FM & AM
- **Frequency Range:** a) 26-57.995 MHz Space...5 kHz
  b) 58-88 MHz Space...12.5 kHz
  c) 108-180 MHz Space...5 kHz
  d) 380-514 MHz Space...12.5 kHz
- **Sensitivity:** FM..a) 26-180 MHz 0.4uV S/N 12 dB
  b) 380-514 MHz 1.0uV S/N 12 dB
  AM..a) 26-180 MHZ 1.0uV S/N 12 dB
  b) 380-514 MHz 2.0uV S/N 12 dB
- **Selectivity:** FM.....More than 60 dB at —25 kHz
  AM.....More than 60 dB at —10 kHz
- **Dimensions:** 210 (W) x 75 (H) x 235 (D) mm
  8-1/4 (W) x 3-1/4 (H) x 9-1/8 (D) in.
- **Weight:** 2.8 Kgs.
- **Clock Error:** Within 10 sec./month
- **Memory Channel:** 16 Channels
- **Scan Rate:** Fast.....8 Channels/sec.
  Slow.....4 Channels/sec.
- **Seek Rate:** Fast.....10 Channels/sec.
  Slow..... 5 Channels/sec.
- **Scan Delay:** 0, 3 or 4 seconds
- **Audio Output:** 2 Watts
- **Ant Impedance:** 50-75 ohms
  Whip or External Antenna with LO/DX Control (20 dB ATT.)
- **Freq. Stability:** 26-180 MHz ... Within 300 Hz
  380-514 MHz ... Within 1 KHz

The JIL SX-200 represents the latest **STATE-OF-THE-ART** technology in the development of Scanning Monitor Receivers. It has many features that previous have not been available on receivers of its type.

For example the tremendous frequency coverage, which encompasses all of the following bands:— **HF & UHF CB, 27 & 155MHz MARINE, Australian LOW BAND, AIRCRAFT band, VHF SATELLITE band, 10Mx, 6Mx, 2Mx** and **70CMx AMATEUR, VHF HIGH BAND** and **UHF TWO-WAY band** — as well as many others. Other features include detection of **AM** or **FM** on all bands. Squelch Circuitry that can be used to **LOCK OUT** carrier only signals. Fine Tuning control for off channel stations, **240 VAC** plus **12VDC** operation, Squelch Operated Output that may be used to trigger a tape recorder or channel occupancy counter and accurate Quartz Clock.

$599

plus $10 P&P

ACCESSORIES

Service Manual $12 + $2 P&P

Scan-X Base Antenna $62 + $10 P&P

JIL SX-200 A BETTER SCANNING MONITOR RECEIVER

HIGH QUALITY AND PERFORMANCE

JIL have designed the SX-200 as a high quality, high performace programmable scanning receiver at a realistic price, design criteria which are not born in many other receivers of its type.

MECHANICALLY RUGGED

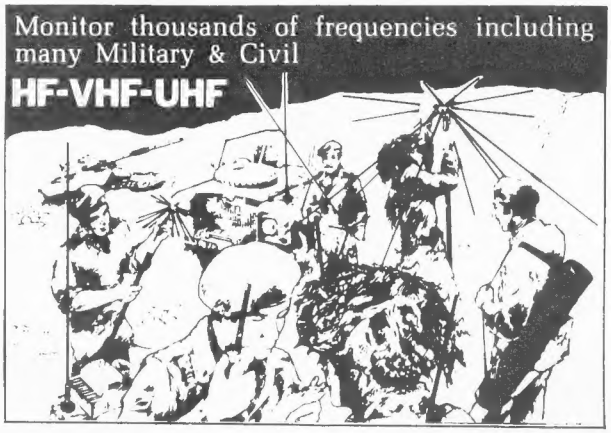
The JIL SX-200 is ruggedly built using EPOXY-GLASS printed circuit board and double sided through hole plating techniques. Easy access and servicability is maintained throughout its design.

4 BIT MICROPROCESSOR WITH ONBOARD ROM AND RAM

A powerful 4 Bit PMOS Microprocessor, the uPD553, is used as a controller in the SX-200. Its features include 2000 x 8 ROM and 96 x 4 RAM onboard as well as up to 80 instructions with a 3 level subroutine stack.

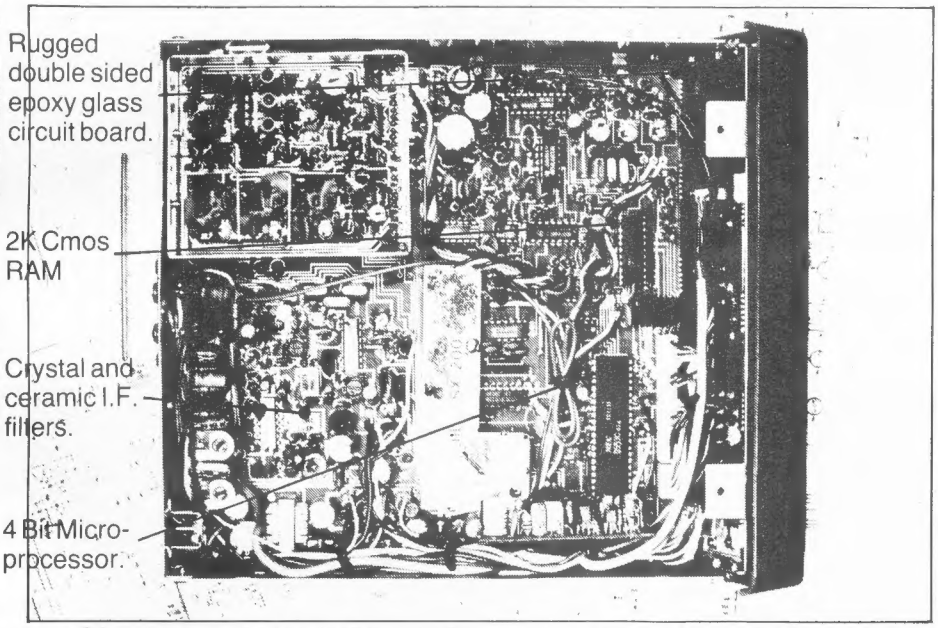
EXTREMELY LOW SPURIOUS COUNT

Even though the SX-200 covers over 33,000 Channels JIL, through careful design, have been able to reduce the number of internally generated spurious signals to an extremely low level. Not the case in most other scanning receivers.



FULLY TRACKED RF AMPLIFIERS

The SX-200 makes use of 3 separate RF Amplifier Stages. They are divided into 6 bands, each band having its own electronically switched coils which are fully tracked with the receiver frequency using Varicap Diodes. Maximum performance is thus gained over the entire operating range of the set.



SX-200, RUGGED CONSTRUCTION AND EASY SERVICABILITY.

NEW ACCESSORIES

■ EXP-32 KIT
Increase the memories of your SX-200 to 32 with this memory expander kit.
$53 + $2 P & P

■ A4-AM KIT
Provides automatic AM operation on the 27 MHz CB/MARINE and AIRCRAFT bands.
$32 + $2 P & P

■ CVR-1B CONVERTER
allows your SX-200 to cover 180 to 380 MHz (Incl. SPACE SHUTTLE frequencies).
$199 + $5 P & P

■ CVR-2 CONVERTER
allows your SX-200 to cover the SHORT WAVE bands, 0.55 to 30 MHz.
$189 + $5 P & P

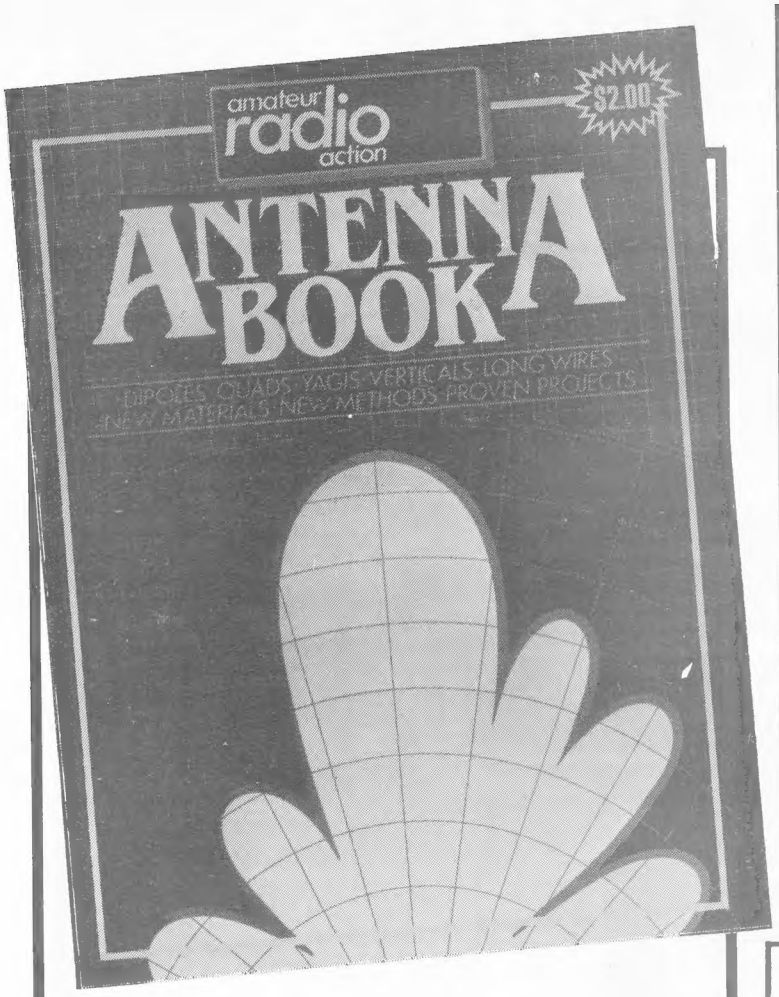
■ MFJ-332 VLF CONVERTER
allows your SX-200 to cover 5 KHz to 1600 HKz
$144 + $5 P & P

AVAILABLE FROM

W.A.: Letco Trading Co. (09) 387 4966, N.S.W.: Emtronics (02) 211 0531, QLD: CW Electronics (07) 397 0808, S.A.: Jensen Intersound (08) 269 4744, Plus many other regional outlets, contact GFS for your nearest stockist.

GFS Electronic Imports

17 McKeon Road, Mitcham, Victoria, 3132
PO Box 97, Mitcham, Victoria, 3132 Phone: (03) 873 3939, 873 2652
Telex: GFS AA 38053 Cable: "Comimports" Melbourne

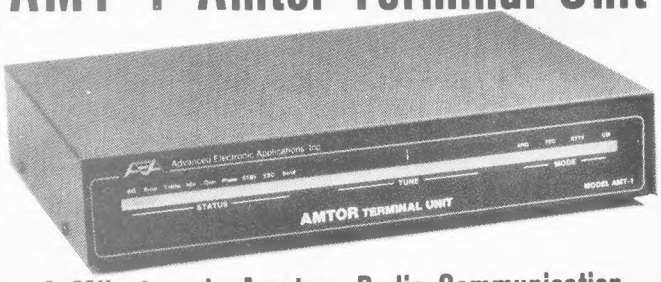

amateur radio action
$2.00
ANTENNA BOOK
DIPOLES · QUADS · YAGIS · VERTICALS · LONG WIRES
NEW MATERIALS · NEW METHODS · PROVEN PROJECTS

The Amateur Radio Action 'ANTENNA BOOK'....

76 pages of antennas, antennas and more antennas . . . cover to cover . . .

ON SALE NOW AT YOUR NEWSAGENT ONLY $2·00

AMT-1 Amtor Terminal Unit

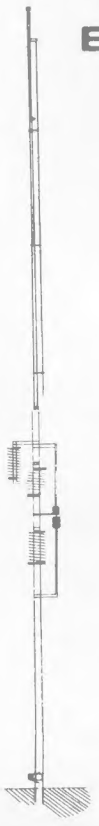


A Milestone in Amateur Radio Communication

- Full AMTOR error correcting data communication facilities **plus** RTTY, ASCII and CW (transmit only).
- Operates with most HF transceivers and home computers (or data terminals).
- Mode and configuration control from the terminal keyboard or by computer program control.
- 16 LED Panadaptor type tuning indicator plus status indicators for all operating modes.
- Crystal controlled AFSK sine wave function generator and 4-pole active receive filter.
- Microprocessor based with transmit and receive data buffers.
- Operates from a simple 12V power supply.
- Lower cost than many similar units which do not offer AMTOR.

CW ELECTRONICS
416 LOGAN ROAD STONES CORNER
BRISBANE
PHN: (07) 397 0888

BUTTERNUT ELECTRONICS CO.



Still More Usable Antenna For Your Money . . . Plus 30 Metres!

Butternut's new model HF6V* offers more active radiator on more bands than any other vertical of comparable height. DIFFERENTIAL REACTANCE TUNING ™ circuitry lets the 26' antenna work on 80/75, 40, 30, 20 and 10 metres and a loss-free linear decoupler gives full quarter wave unloaded performance on 15 metres. It can also be modified for remaining WARC bands.

- ★ Completely automatic bandswitching 80 through 10 metres including 30 metres (10.1-10.15 MHz): 160 through 10 metres with optional TBR-160 unit.
- ★ Retrofit capability for 18 and 24 MHz bands.
- ★ No lossy traps to rob you of power. The HF6V's three resonator circuits use rugged HV ceramic capacitators and large-diameter self-supporting inductors for unmatched circuit Q and efficiency.
- ★ Eye-level adjustment for precise resonance in any segment of 80/75 metres, incl. MARS and CAP ranges. No need to lower antenna to QSY between phone and CW bands.
- ★ For ground, rooftop, tower installations — no guys required.

Model HF6V (automatic bandswitching 80-10 meters) **$282**
Model TBR-160 (160 metre base resonator)
(When supplied as part of HF6V) **$66**

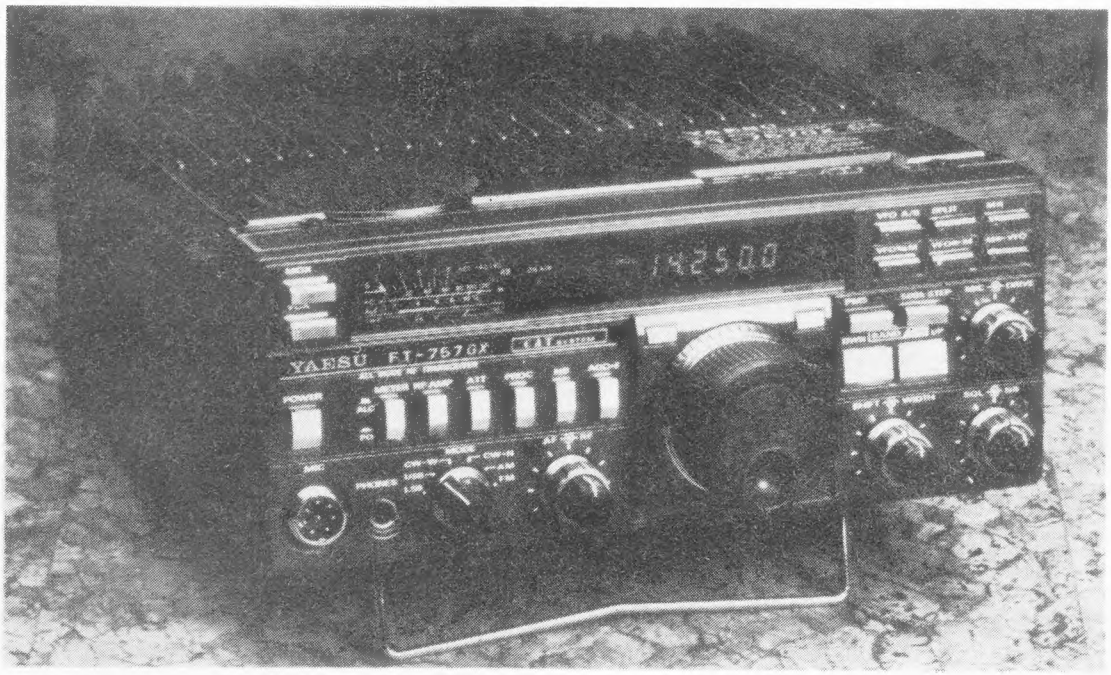
For complete information concerning the HF6V and other Butternut products, amateur and commercial, contact the sole Australian distributor:-

TRAEGER DISTRIBUTORS (NSW) PTY LTD
PO Box 348, Moree, NSW. 2400.
Cnr Adelaide & Chester Sts.
Phone (067) 52 1627

★ Patented device

The HF Allmode Transceiver you have been waiting for — from **YAESU**

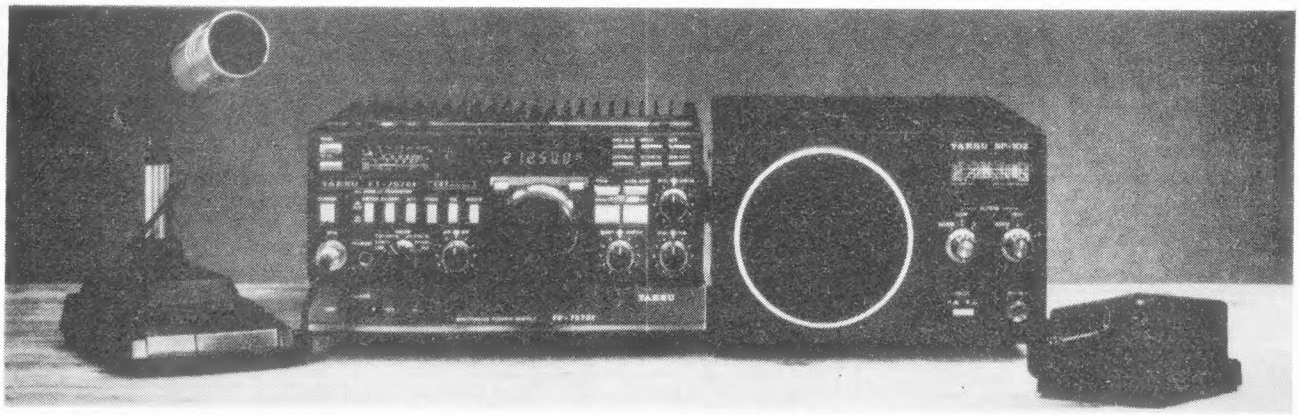
FT757GX



100W Output PEP/DC — 25W AM Carrier — 13.4 V DC, (19 A for 100W output) — Weight 4.5 kg

FEATURES:

- Dual VFO s and eight memories.
- Programmable Memory Scanning.
- SSB, AM, FM Modes Standard.
- Squelch on all Modes.
- Full Break-in CW.
- Accessories installed include: 600Hz CW Filter, iambic keyer with dot-dash memory, marker, IF shift and width, N.B. (only option is CAT Interface to external computer control).
- High performance General Coverage Receiver.



bail

BAIL ELECTRONIC SERVICES
38 FAITHFUL STREET, WANGARATTA 3677
Telephone: (057) 21 6260 — Telex: 56880
DISTRIBUTORS AND AGENTS IN ALL STATES

Stan Roberts and Staff — VK3BSR

a word from your EDITOR

This magazine is the first for 1984. A year which was once so far in the future that a prediction of a future society could be set there.

Today's society and life is changed. In many ways it is as traumatic as that envisaged, but many things remain unchanged. Indeed much is vastly improved.

Amateur radio has survived. The hobby as we know it now is very much the same as it was in its ideals and in the people taking part but we now have a greater diversity of interests, a greater sophistication and an improvement in our equipment. Surely this is how the earlier experimenters would have wanted it.

At this time of year, with festivities and holidays we may reflect on 1983 and make fresh plans for 1984. We should look to the future and the new field we may explore. The future is bright with many exciting things to do.

Computers serving amateur radio both as equipment aids and also as the heart of new sophisticated communications systems are but one avenue. Cheap and available processors may well hold the key to previously unheard of communications achievements.

Space is another new frontier. Who knows what exciting areas may be opened up by amateur radio in space as amateur communications and experimenters may well exploit some new facet of radio communications.

Our magazine will be going forward too. Remember to write up your experiments so that others may share them. Articles on both new and old techniques are always needed. You would be surprised how many people are interested in something which may seem mundane to the would-be author. author.

Not only the "whizz-bang" high technology, but also the articles about things of interest to newcomers. Basic antenna, operating and equipment articles are equally as welcome as those pushing the frontiers.

Make a new year resolution, contribute to the future by writing an article. Most importantly though enjoy amateur radio and make some contribution in some way to the future of the hobby.

Gil Sones, VK3AUI
EDITOR
AR

WIA NEWS

SHARING OF 50-52 MHz

As a result of an ad hoc meeting between the Wireless Institute of Australia and the Department of Communications called by the Broadcast Council during October, in Sydney, it was agreed that the following proposal be put to the Broadcasting Council:

(1) Outside the transmission hours of any Channel 0 TV station
No special restrictions on operation anywhere in Australia in band 50-52 MHz.

(2) Within the transmission hours of any Channel 0 TV station
(a) Western Australia and the "External Territories": no special restrictions on operation in band 50-50.15 MHz.
(b) Western Australia and the "External Territories": operation restricted to 100W peak envelope power, suppressed carrier, in band 50.15-52 MHz.
(c) Northern Territory: operation restricted to 25W peak envelope power, suppressed carrier, in band 50-50.15 MHz.
(d) South Australia, Tasmania: operation restricted to 25W peak envelope power, suppressed carrier, in band 50-50.15 MHz.

The meeting agreed that proposals 2(a)–(c) were unlikely to result in interference to any existing Channel 0 station.

However, in the opinion of FACTS, proposal 2(d) may result in interference to Government-funded services operating in Channel 0. The concurrence of the SBS would be necessary before this conclusion could be ratified by Council.

Variation of the agreed conditions will be considered only if there is a significant change in circumstances (eg the removal or addition of television stations transmitting on Channel 0).

An extract from the *DRAFT* minutes of the Broadcasting Council meeting of the 10th November is shown below. These draft minutes are subject to confirmation at a subsequent meeting of the Broadcasting Council.

7. Amateur use 50-50.15 MHz

7.1 The Chairman referred to the paper (BC 83/11/4) produced as a result of an ad hoc technical sub-committee on 20 October 1983 with representatives of the WIA. He noted that the SBS had formally advised that it could not agree to proposal 2(d) until its services on Channel 0 in Melbourne ceased (towards the end of 1984). FACTS and FARB asked how amateurs were to know whether particular Channel 0 stations were transmitting, especially on those occasions when the ABT authorised variations of the Hours of Service for special purposes. DOC said that the Wireless Telegraphy Act licences would need to be endorsed with the agreed conditions of operation, but conceded that only the Department was in a position to inform licensees of changed conditions with respect to Hours of Service. The Broadcasting and Television Act now required that the ABT be notified of any proposed changes in Hours of Service; however, if a station wanted protection against interference from amateur operation during those hours, it would also need to inform DOC, so that the amateurs themselves could be informed.

VALE W4KFC

Amateur radio throughout the world has suffered a great loss with the passing of Victor C Clark W4KFC, President of ARRL, at the end of November.

The WIA extends condolences to his associates and friends at ARRL.

PRESIDENTIAL COMMENT

TIME MARCHES ON

We are still in the festive season and the Executive trusts that each member has enjoyed themselves to the best of their ability.

The work of the WIA does not rest however, and in fact, after a very busy 1983 we now turn our attention to 1984 issues.

What will be the issues? Well, some we are aware of, the Radio Communications Bill 1983, to which a great deal of time and energy was expended, will no doubt, give birth to many new regulations and standards during 1984. In this area, the Executive have tasked its CASPAR Committee, with the job of looking at each and every one of them, then reporting its findings to enable the Executive and Councillors to make the required judgements.

The repeal of the by-law effecting HF transceivers, the WIA is still in an ongoing negotiation position, with both the Department of Communications and the Customs Department. This is another issue that will continue into the early part of 1984.

Again I return to the question, what will be the issues of 1984 — well, if I may make a point, issues are generated from two main areas: The Government of the day and its Departments, and Agenda items at the Annual Convention of the Institute.

We cannot fortell what the Government or its Departments will produce for us to deal with in 1984 but Agenda items are a different question. The next Convention of the Institute will take place in Melbourne during April, when you read this, less than three months will be left in which Agenda items may be submitted by Divisional Councils for inclusion in the Agenda. Time is therefore of the essence, to enable the processes of the Institute to take place, it is time that members with some definite thoughts in mind began submitting them to their Divisional Councils for consideration.

If I may give some advice on preparing your proposals — think them through carefully, consult your Federal Councillors, take their advice, they will be aware of policies and past proposals that have been rejected. For example, for the past four years there has been an Agenda item to extend the privileges of Novices. In each of those years the WIA Council has said "No".

Bring in some fresh thoughts not rehashed old ones.

Is there room for a sort of "incentive licensing"?

Should this be restricted to Novices only?

Should we look at licensing systems overseas?

Should we have an "extra" class with commensurately higher power?

Do not forget, it is you the members who can change things. If it is possible, attend your Council Meetings to back up your proposals, if attendance is out of the question due to time and distance, speak to your Councillors, ensure your point is understood, so that he or she may speak on your behalf during discussions of your proposal.

As President, I look forward to lively, friendly discussion at the next Convention of items generated by members to enhance our hobby during 1984. As I mentioned earlier, April is not far away. There is much to be done.

You owe it to yourself and your WIA Division to become involved

73 to all

Bruce R Bathols, VK3UV
FEDERAL PRESIDENT
AR

MEMBERSHIP SUBSCRIPTIONS
Are Now Due!!!!!!!

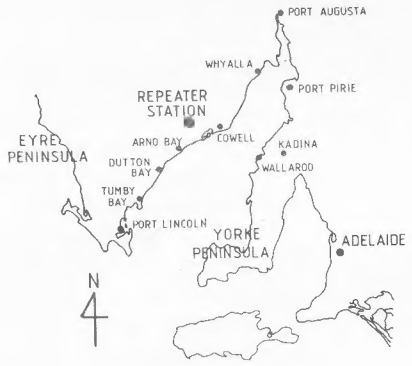
To ensure continuity of your Amateur Radio Magazine and the work of your Institute.

PLEASE PAY PROMPTLY!!!

VK5REP: THE COWELL REPEATER

Brian Warman, VK5BI
Box 677, Whyalla, SA 5600

The Eyre Peninsula region of South Australia is a sparsely populated area with widely separated towns established mainly along the eastern coast. One of the largest and most popular tourist towns in Australia is located at its southern tip — the beautiful Port Lincoln.



Map showing location of the repeater site and surrounding area.

When I learned of plans to establish a VHF radio base for the Country Fire Service at a location near my QTH, I immediately thought of the possibilities for amateur radio. Approaches to Local Government pointing out the part played by amateurs in emergencies revealed that joint use of the facility was a distinct possibility. It was suggested that local amateurs would be prepared to assist by performing first in maintenance functions on the CFS equipment.

The WIA, SA Division, informed me that the first thing to do in setting up a repeater was to establish the level of interest in such a project. Accordingly, I sent out letters to all licenced amateurs within the expected service area of such a repeater. This letter outlined my proposition, pointed out the expected coverage and asked whether the recipient would be prepared to support a project to establish a VHF repeater; either by the donation of cash, or by technical help.

From replies received it appeared there was sufficient support for planning to commence.

COMMERCIAL SPONSORSHIP

The next stage was to try for some commercial sponsorship.

A letter to Dick Smith Electronics led to an offer of a 2 metre radio. Naturally this offer was gratefully accepted. Lloyd, VK5LL, agreed to construct a Duplexer — he had previously made one for VK5RMN. This in fact was the first component to be completed.

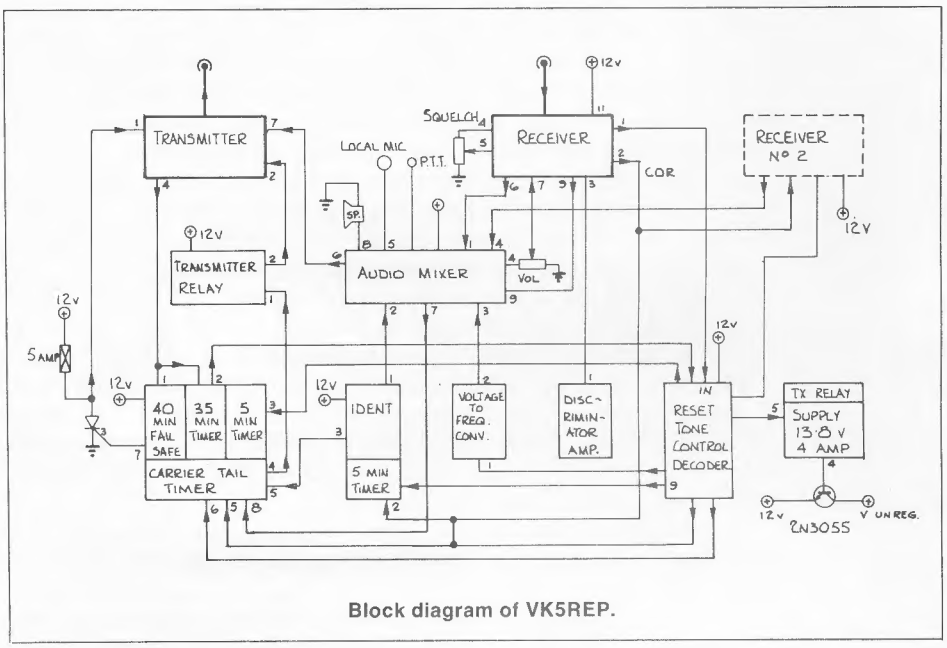
When the 2 metre radio was received, Gary went to work. The unit is a FDK Quartz Multi 16.

It was decided that it would be quite feasible to split the transmit and receive sections of the rig.

An approach to the Radio Centre in Archerfield, Qld, led to June Taylor agreeing to supply us with an AEA Isopole at cost. This antenna has a gain of 6 dB.

SYSTEM DESIGN

The unit is divided into blocks comprising transmitter, receiver, power supply, control, timer, ident, and local metering. Circuits used came from various sources including the ARRL Repeater Book, ARA, and VK5RCN, the Northern TV Repeater.



Block diagram of VK5REP.

The transmit and receive sections of the Quartz 16 were fitted into individual boxes constructed from PCB material. Very little work was needed on this equipment, however the transmitter output transistor was changed.

A power supply was constructed which comprises a 7812 three terminal regulator driving a 2N3055. A voltage to frequency converter is incorporated in the system. This device generates a frequency based on the input voltage. Operation will be explained later.

Provision was made in the design for the incorporation of a second receiver. The idea was to provide a 1.8 MHz receiver for relay of the Sunday morning WIA Session. Tests have shown however, that transmission from Adelaide is neither strong enough or sufficiently stable to allow this facility to be used and on the advice of the Department of Communications this potential may be incorporated in a repeater interconnect with VK5RMN at a later date.

TESTING THE REPEATER

Equipment used in setting up the repeater was a Marconi Signal Generator, Singer Gersch Monitor and Bird Wattmeter. A problem encountered in the testing was caused by RF getting into the decoder board. This was due to the use of single shielded co-axial cable in the common loom. The substitution of double shielded cable overcame the problem. A faulty joiner on the output of the Duplexer caused a week of indigestion — it is essential to use double shielded cable here as well.

The duplexer was set up as follows. A remote antenna was connected to a signal generator. The repeater was cabled to the Duplexer which was then tuned for maximum signal transfer as detected on the repeater receiver. Sensitivity proved to be better than the quoted figure of 0.7 micro volts. Power output from the duplexer was measured at 15 watts for 20 watts transmitter output.

The repeater was put on test in Whyalla, the largest regional city in South Australia and 110 km from the proposed site, for three months. Reports of poor audio quality were traced to the receiver/transmitter de/pre emphasis networks. Once these were rendered inoperable the problem disappeared. The repeater is not forgiving in the case of over-deviation — anything more than 7 kHz causes transmit audio to break-up.

Once the repeater had been assembled it underwent extensive testing at Paul's QTH in Whyalla. Tests included running the transmitter continuously for two to four hours per day.

Also, the repeater was submerged in insulation and heat tested in an effort to ensure there would be no operational problems at the site.

In early July 1982, all was declared ready for installation.

INSTALLATION

The CFS site is located about 25 km from the town of Cowell on Eastern Eyre Peninsula. It is well clear of any roads and for this reason must be considered fairly secure. A 20 m self-supporting tower and block house had been established for the original installation. Paul and the boys were not too happy with the set-up so they went to work and upgraded the installation by putting in a bullet proof door and re-installing the existing antenna and feed line. Extra power points and a separate meter were provided so that there should be no doubts about electricity usage.

The Isopole was installed at the 20 metre point on the tower. This places it below and well clear of the CFS installation. The antenna is fed to the duplexer via heliax cable in order that losses may be minimal.

The photographs clearly show the layout of equipment in the shack. The Gongs and 25 AH battery are installed on the floor below the repeater. Spare parts, first aid kit and the handbook together with a lead-light are kept in a cupboard above the repeater. All equipment has been mouse proofed and treated against whiteants. The repeater was commissioned on 1st August, 1982.

Initial tests confirmed our expectations as to its performance and range. Contacts were exchanged over a very wide area of the western part of South Australia. All concerned adjourned for a barbecue and then made their way home to their respective shacks. Alas — the best laid plans etc. Late that night it became clear that all was not well with the new installation. The repeater was noisy and had low output. A rush trip to Cowell that night by Paul and Don revealed a faulty driver transistor in the transmitter which had resisted all 'soaking' procedures.

REPEATER OPERATION

Under normal conditions all control functions are reset, the transmitter is off, the receiver is on, and all timers are reset. When a signal is received the COR line goes low, operating the transmitter via the transmitter control board. The COR line also triggers the ident board which will ident when the COR line returns to "high", eg when the receiver mute closes again.

The ident holds the PTT of the transmitter on until the ident has finished. The repeater will not ident again for five minutes (the time being adjustable). This can be overridden by using a tone. The tail period between the closure of the mute and the point the transmitter is turned off is controlled by the "carrier tail timer" situated on the transmitter control board, this time delay is adjustable. If the received signal remains on for more than five minutes, (the time being adjustable), the five minute time out timer will go high and switch off the transmitter. This will remain off until the received signal is removed. The repeater will then reset itself.

The five minute time out timer can be disabled for the rebroadcast of the VK5WI news broadcast by using a tone. The thirty five minute timer then takes over. If the transmitter is on for the full thirty five minutes, the thirty five minute timer turns the transmitter off and also resets all the control functions, returning the repeater to normal operation.

If the repeater transmitter does not turn off in response to the five minute and thirty five minute timers then at forty minutes the fail-safe timer will fire and the SCR across the supply to the transmitter, blowing the fuse in this supply line, therefore stopping the transmitter and making it necessary to visit the repeater site. The thirty five and forty minute timers are reset only when the transmitter output stops as the reset circuit operates from a RF pickup from the transmitter.

AEA isopole at top of the tower. Above is the CFS UHF antenna.

The transmitter can be dissabled remotely by a further tone. The receiver will remain operating but no retransmission of the signal will occur.

VK5REP neatly installed. Below is combiner and standby battery, and on the wall — handbooks and tool kit.

Another tone turns on a voltage to frequency converter whose output feeds onto the transmitter signal. This enables the battery condition to be evaluated remotely by connecting a frequency counter to the audio output of a receiver — 1 kHz corresponds to 10 volts, 1.2 kHz corresponds to 12 volts, 1.38 kHz corresponds to 13.8 volts, etc.

The internal battery charger can also be switched off remotely. Therefore the voltage will be that of the battery under load.

The secondary receiver can be operated by a combination of tones. The audio from receiver No 2 will now be transmitted, however when a 2 metre signal on the normal receiver exists the audio from the secondary receiver will not be transmitted.

Local metering and function indicators are provided at the repeater site.

CONCLUSION

The repeater has now been in operation for more than six months and has performed according to expectations. Coverage is excellent, providing reliable access to stations along Eastern Eyre Peninsula and total coverage of Yorke Peninsula. The realisation of the Cowell Repeater confirms that a small group of amateurs separated by great distances, up to 300 km, can follow a project through to fruition.

The West Coast Repeater Group Inc are indebted to all who made donations and to VK5s AS, BI, EN, KHR, LL, OL, QM, ZRG, ZSM, UQ, AWB, for their direct support as well as Dick Smith Electronics, The Radio Centre, Department Of Communications, and the SA WIA Repeater Group.

AR

Join a new member NOW!!!!!!!

EQUIPMENT REVIEW

Lew Whitbourn, VK2ZIP
PO Box 218, Lindfield, NSW 2070

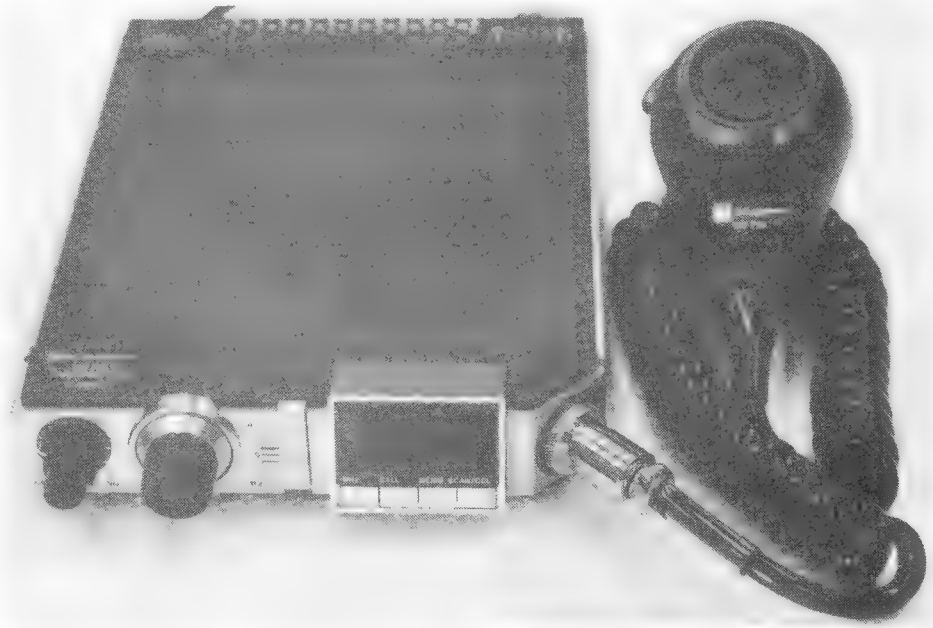
THE STANDARD C8900E TWO METRE FM TRANSCEIVER

The C8900E is an ultra-compact ten watt mobile transceiver covering 144.000 to 147.975 MHz in 25 kHz steps. Notable features are a tilting LED frequency display and a very sensitive receiver using a GaAs FET. Its small size would make it very attractive for mounting in vehicles with limited space.

DESIGN CONCEPT

The C8900E seems to be designed especially for installation in small cars, where there is often very little spare room under the dashboard. To get its size (138 W x 31 H x 178 D m/m) into perspective I compared it with the size of this page and discovered that two would sit nicely on this page and still leave a 25 mm margin down one side! To complete the image of a sensible and convenient mobile package Standard (a division of Marantz, Japan, Inc) have provided modest memory and scanning facilities, a minimum of controls, and a pushbutton/LED display unit which can be tilted upwards by 15° to facilitate visibility under a dashboard. The 10 watt output power seems quite in keeping with the concept and is quite adequate for most uses. The very sensitive GaAs FET front end is a pleasant bonus which any manufacturer should now be able to offer at virtually no extra cost.

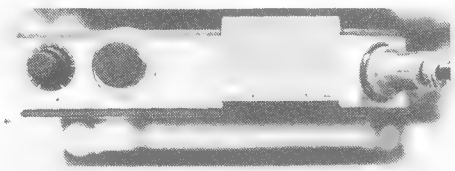
With so many "microprocessor controlled" transceivers appearing on the market nowadays, and features such as memories and scanning becoming commonplace, considerations such as ergonomics and "user-friendliness" are becoming more important to amateurs trying to choose a radio. It is a great challenge to designers using microprocessors to come up with more appealing and user-friendly schemes of frequency and mode selection. The C8900E shows some unique approaches to certain operations and I shall refer in more detail to these below.



OPERATING

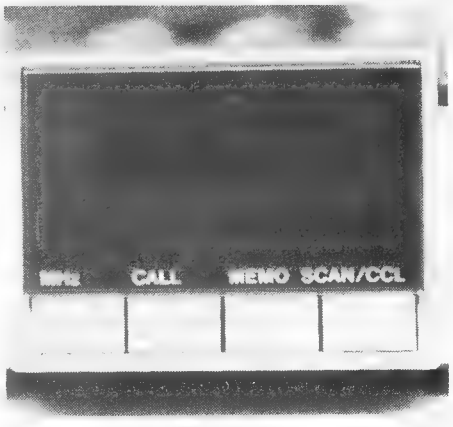
The C8900E has a dual-concentric on-off, volume and squelch control on the left-hand side of the front panel — refer photo. Frequency selection in steps of 25 kHz (only) is by means of an optically encoded rotary switch just to the right of this, or by the up/down switch on the microphone. Steps of 25 kHz are very convenient for mobile use as one can fairly quickly tune through most channels of interest without stopping anywhere but on-centre of any occupied channel. In effect the 25 kHz steps reduce the need for lots of memory channels. My only criticism here would be that the knob is small and the clicks are rather firm limiting the rate at which tuning can be accomplished. On the other hand, for a driver counting clicks without looking, the very positive resistance of the tuning knob is ideal.

The frequency selected is shown by a four digit red LED display (starting with 6.000 for 146.000 MHz at switch-on) in a tilting housing shown tilted up by 15° in Photo 1. Under the frequency display there are five LEDs for signal strength and power output and under these a set of four pushbuttons. The left-hand button, labelled "MHz", increases the display frequency by 1 MHz, and like all other buttons, causes a pleasant audible beep each time it is pressed.



On-off volume and squelch control to the left of the front panel.

The remaining three buttons in the display housing are labelled "call", "mems" (memory) and "scan/ccl" (scan/clear) respectively. The call button transmits a signal with a 1750 Hz tone burst, which is not of much interest in Australia. It might be useful for some modification. There are five memories, numbered one to five, and selected by pressing the memory button the corresponding number of times. When a memory is first selected the display shows E.EE.E with the second decimal point blinking which means "enter" and not "error", which worried me for a while!



LED Display.

The frequency is entered by operating the rotary frequency selection knob and then by pressing "mems" and "scan/ccl". Scanning is possible in three different modes and is started or stopped by the "scan/ccl" button. The scan mode is determined in a rather unusual manner by the status of memories 4 and 5. Band scanning is performed when any frequency is stored in memory 4, but none in memory 5. Scanning of the current MHz range is performed if no frequency is stored in memory 4. Finally, when frequencies are stored in both memory 4 (M4) and memory 5

The C8900E showing the LED display tilted at 15 degrees, the microphone socket is to the right and on the extreme right are the external meter and speaker sockets.

(M5) scanning proceeds upwards from M4 until M5 is reached and then back to M4. If M5 is less than M4 the radio quite logically scans from M4 to 147.875 MHz and then from 144.000 MHz to M5 before returning to M4 and starting again.

There is no provision for scanning the memories. One curious thing is that the handbook mentions a sixth memory to allow non-standard repeater offsets but does not give instructions on how to use it. I could not work out how to use it but since the feature is not of much interest here I didn't try too hard either. Probably M6 can be accessed by pressing more than one button in some particular sequences — it could be an interesting challenge for someone with the right kind of mind!

Repeater operation is selected by the vertical slide switch in the centre of the front panel (Photo 1), and is again most unusual in its operation. Starting from the centre simplex position, labelled S, and sliding the switch upwards to the R1 position instantly increases the display and receiving frequency upwards by 600 kHz. The frequency then jumps downwards by 600 kHz on transmit. Sliding the switch downwards from S to R2 has no effect on the display or receiving frequency but causes the frequency to jump upwards by 600 kHz on transmit. This arrangement gets the most out of one switch, allowing both Tx-up and Tx-down duplex and reverse duplex operation on both, but it takes a little thought to use.

The important thing to remember is to select the required mode (R1 for Tx-down, S or R2 for Tx-up) before changing frequency otherwise you can find yourself selecting the required frequency twice!

ON AIR

I operated the C8900E on the passenger seat for a few days and was grateful for the top mounted speaker which, I think, would never be a disadvantage. The tilting display was very useful in this situation and would be equally suitable for under-dash mounting. Unfortunately the LED display, which was extremely clear and appealing at night, was not too visible in daylight but would be at less disadvantage under the dashboard in a more conventional installation. The pushbuttons were hard to find at night, but are not often needed in mobile operation.

The quality of the received audio and the smoothness of the squelch circuit were excellent, with the result that the set could be left scanning with a minimum of aural discomfort. The sensitivity of the receiver immediately asserts itself in this mode of operation; even mobile I was hearing repeaters that I did not usually know about! Reports on the quality of the transmitted audio were equally good. I shall deal in more detail with the receiver and transmitter in the sections below.

RECEIVER

As mentioned already, the receiver owes its sensitivity to a GaAs FET front end. The device used is the 3SK97 which is the current best Japanese consumer GaAs FET. The quoted sensitivity is 0.15 μV for 12 dB SINAD or 0.2 μV for 20 dB quieting. Unfortunately I cannot do SINAD measurements but in Table 2 I show measured quieting as a function of applied signal strength.

The receiver was well within its specification. Standard have complimented the low

GENERAL

Frequency range	144 ~ 148 MHz
Mode of opration	16 F3
Power supply	DC 13.8 V
Power drain	Tx: 2.8 Amp
	Rx: stand-by 0.4 Amp
Microphone input impedance	600 ohms
Audio output impedance	8 ohms
Antenna impedance	50 ohms
Polarity	Minus grounding only
Dimensions	138 (W) x 31 (H) x 178 (D) m/m
Weight	1.1 kg

TRANSMITTER

RF output power	10 watt
Spurious emission	60 dB
Maximum deviation	±5 kHz
Modulation	Reactance method

RECEIVER

Type of reception	Double superheterodyne
Intermediate frequency	1st IF 10.7 MHz
	2nd IF 455 kHz
Sensitivity (12 dB SINAD)	0.15 μV
(20 dB QS)	0.2 μV
Threshold sensitivity	0.085 μV
Bandwidth	±7.5 kHz (-6 dB)
Selectivity	More than 60 dB
Audio output	2 watt at 10% distortion

Table 1: Manufacturers Specifications

Signal (μV)	Noise Quieting (dB)
0.056	3
0.078	6
0.095	9
0.11	12
0.13	15
0.15	18
0.17 (< 0.2)	20
0.27	25
0.44	30
1.4	40

Table 2: Receiver Sensitivity

Signal (μV)	No of LEDs
0.07	1
1.7	2
2.4	3
3.2	4
4.2	5

Table 3: Signal Strength LED Calibration

Signal (μV)	Output (mV)
0	0.2
0.05	0.3
0.1	0.5
0.2	0.7
0.4	3.7
0.8	35
1.6	140
3.2	370
6.4	800
12.8	1.4 V
25.6	1.9 V
57.2	2.1 V
100	2.1 V
200	2.1 V

Table 4: Signal Strength Output Calibration

Supply Voltage (V)	Rx Current (mA)	Tx Current (A)	Power Output (W)
14	290	2.8	10.5
13.8	290	2.8	10.5
13	290	2.8	10.5
12	290	2.8	10.3
11	285	2.7	10
10	280	2.4	8
9	265	2.1	5.5
8	250	1.9	3.5

Table 5: Current Drain and Power Output

noise figure of the 3SK97 with a high quality dual helical filter at the input. The mixer (a 3SK102) is then protected from many embarrassments by a triple helical filter of the same quality. The first IF is at 10.7 MHz, using a pair of MCFs, and then the rest of the RF signal processing (2nd local oscillator, conversion to 455 kHz, squelch and detection) occurs in the now-ubiquitous MC3357. Despite the vintage of this chip it all works very smoothly. A sample of the 455 kHz IF is taken from the MC3357, which does not have a signal strength output, to a two stage meter amplifier (FET plus BIPOLAR) and detector to drive the signal strength LEDs and the external meter output. Table 3 shows the signal strength required to light the specified number of LEDs, which, not surprisingly, do not cover a very wide dynamic range. The signal strength output is better in this regard, as shown in Table 4.

TRANSMITTER

The transmitter uses an RF power amplifier module with the type number QTO4-SAV5. An impressive feature of this module is its ability to produce full rated power with supply voltages down to 11 V, as shown in Table 5. Thus full power is available even from a relatively flat battery in a vehicle without the engine running! Table 5 also shows current drain on both receive and transmit, as a function of supply voltage. It is interesting that no increase of power is achieved by increasing the supply voltage above 13 volts.

GENERAL COMMENTS

The external speaker and external meter sockets are 3.5 mm phono types and are located on the side panel just behind the microphone plug. They can be seen in profile, one above the other in Photo 2. Just to the rear of these there is a "memory backup" slide switch, which can also be seen in profile in the photo. I was disappointed to fund that, rather than isolating an internal backup battery, this switch lets you decide whether you want a continuous 45 mA drain from your car battery, when the set is switched off. By the way, the currents given in Table 5 are for memory backup on.

Photo 3 shows the interior view of the radio from the top, the view from the bottom being a continuous piece of fibreglass circuit board. The quality of components and construction appears excellent throughout. The top and bottom covers are in one piece, bent into a U-shape, with perforations at the back to allow ventilation of the heatsink.

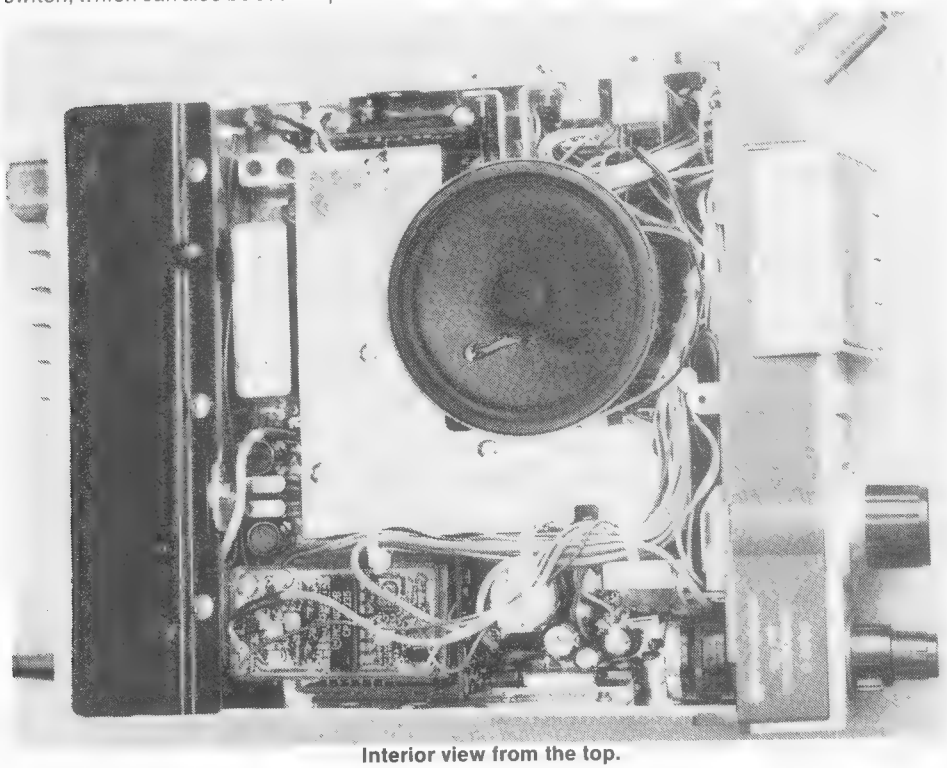
The radio comes very well packaged, with the Standard MP716 microphone, a new type of "low-profile" mounting bracket that clamps the radio firmly between non-scratching rubber blocks, a fused (5 A) power cord and numerous plugs, fuses, rubber feet, nuts and bolts. A very satisfactory manual is supplied, which includes a fold-out A3-size circuit that is easy to read, block diagram and a "device by device" operating description.

Accessories available for the C8900E are a speaker microphone (MP736) and an extension speaker (C207M).

EVALUATION AND ON AIR TEST — THE STANDARD C8900E

APPEARANCE

Packaging
*** *Much bigger than the radio.*
Size
**** *Very small.*
Weight
*** *1.1 kg.*
External Finish
*** *Elegant case style.*
Construction Quality
*** *Very good throughout.*



Interior view from the top.

FRONT PANEL

Location of controls
***
Size of knobs
** *Small: Inevitable on such a small unit.*
Labelling
** *Not self explanatory but sensible.*
Meter
** *LED type. Small dynamic range.*
VFO knob
NA
Memory knob
** *Small pushbuttons, hard to find in the dark.*
Keyboard
NA

DIAL READOUT

Digital
*** *Large bright red LED display.*
Status indicators
** *All in tilting LED display.*

REAR PANEL

** *Antenna socket only. External meter and speaker sockets on RH side.*

RECEIVER OPERATION

Memories
** *Only five.*
Sensitivity
**** *Can copy 0.15 μV signals.*
Noise rejection
*** *Ignition noise not a problem.*
Squelch action
**** *Very smooth, no speaker clicks.*
"S" Meter
** *Five LEDs. Small dynamic range.*
Signal handling
**** *Five helical filter stages.*
Spurious responses
**** *Non heard.*
Quality of received audio
*** *Very pleasant.*

TRANSMIT OPERATION

Power output
*** *10 watts or more down to 11 V supply voltage.*
Audio response
*** *Natural.*
Metering
** *All LEDs light regardless of power output.*
Cooling
**** *Well ventilated heatsink at back.*
Frequency stability
*** *Within ± 150 Hz at 20° C whenever measured.*

Rating code. Poor * Satisfactory ** Very good * Excellent ****

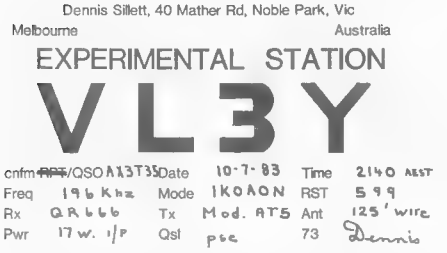
SUMMARY

The C8900E was a pleasure to use and should appeal to anyone with a "space problem" in a small car. A matching unit for 70 cm, the C7900E, is also available and provision is made on the mounting brackets of the units for "piggy-back" mounting. The review unit was kindly loaned by Greg Whiter at GFS Electronic Imports and the current price is $413.

AR

AUSTRALIAN AMATEUR PIONEERS ON LONG WAVE

Jim Linton VK3PC
4 Ansett Crescent, Forest Hill, Vic 3131


Dennis Sillett, 40 Mather Rd, Noble Park, Vic
Melbourne Australia
EXPERIMENTAL STATION
VL3Y
cnfm ~~RST~~/QSO AX3T35 Date 10-7-83 Time 2140 AEST
Freq 196 Khz Mode 1K0A0N RST 599
Rx QR666 Tx Mod. AT5 Ant 125' wire
Pwr 17 w. i/p Qsl pse 73 Dennis

When the HF amateur WARC bands were first suggested sixteen years ago a Melbourne identity in the amateur fraternity proposed that a low frequency allocation also be sought.

John Adcock VK3ACA said that around 1968 Alan Prowse Walker, then head of the Amateur and Citizens division of the US Federal Communications Commission, raised the issue of new HF bands for amateurs.

His view was that because satellites were replacing a lot of HF communications amateurs should push for a number of bands at WARC '79, and this idea was published in Wireless World, CQ, and QST.

John said at the time he wrote to Alan Prowse Walker and magazines to suggest that if amateurs were to press for HF bands they should also seek a low frequency band.

He said he doesn't know whether his letter writing had any effect but a move for a band 160-190 kHz was considered for WARC by Australia.

John said there were objections including one that the LF band was in the frequency range used by power line pilot carriers, and could cause interference to the European Long Wave broadcasting band.

The validity of the objections which came mainly from the United States were questioned by some people at the time with the counter view being that it was technically possible for low power amateur operation to use LF without causing interference.

But without US support the Australian initiative for LF was dropped prior to the WARC.

John said he discussed the issue of LF with a WARC planning committee member and learnt that the Department of Communications had suggested that if any radio amateur was interested they could be issued with an experimental licence for that band.

He said after WARC he and Peter Forbes VK3QI followed the matter up and sought experimental licences.

He said: *"The proposal I put to them (DOC) was that I obtain a licence to operate an experimental station on a low frequency using CW only for the purpose of communication with the other bloke (VK3QI).*

"That the equipment would be amateur radio type equipment using backyard type antennas."

John said the department's consideration of the application took some time and allowed he and Peter, who was at Lake Boga (310 km north of Melbourne) to build their equipment and antennas.

The frequency allocated by DOC was 196 kHz or about 1530 metres with John getting the callsign AX3T35, and Peter AX3T36. A third member of the group is Dennis Sillett VK3WV who has been given the callsign VL3Y.

John and the LF group have been pioneering activity in the new amateur frontier of LF. Operating from Oak Park in Melbourne's northern suburbs AX3T35 has been heard by 30 to 40 listeners.

He said one interesting thing about operation on LF is that horizontal polarisation doesn't exist at these frequencies, all signals are vertically polarised and have a very low angle of radiation.

The vacuum tube transmitter at AX3T35 is a crystal controlled oscillator using a 5763 into a final of a pair of 6CD6s, giving an output of about 100 watts.

An old Gelso HF VFO unit was used as the starting point for the transmitter but the HF components are removed and replaced with components for LF.

The receiving set-up at AX3T35 is a converter into a FRDX400 receiver.

Antenna efficiency is a problem in a suburban backyard at LF. John has done reasonably well in being able to radiate 0.37 of one watt, or in other words achieving 0.37 per cent radiation efficiency with his antenna at an effective height of 30 feet.

John VK3ACA.

He said a higher and larger antenna would see a dramatic increase in efficiency.

"I would say that if you could increase the height of the antenna to 100 feet, and put a great big top load on it, you could approach 10 or 15 per cent efficiency," said John.

The first two-way QSO between AX3T35 and AX3T36 was on 12 April, 1981.

After that John advertised in AR magazine for listeners to several skeds during Sundays.

Those who have sought listener QSLs from John have been as far south as Hobart, north of Newcastle NSW, and on the top end of the Flinders Ranges about 500 kms north of Adelaide.

EXPERIMENTAL RADIO STATION
ON 1531 METRES 196 kHz
AX3T 35
J. A. ADCOCK
12 ALBERT STREET, OAK PARK, VICTORIA, AUST. 3046
TO VL3Y ..... CONFIRMING our two way
Contact on 10-7-83 at 2140 Z
Power 100 W o.p. 35 W r.p. Mode 100H A1A
AMATEUR STATION VK3ACA 73 . . . Dennis FROM JOHN

John said propagation is via ground wave about 500 km radius and during darkness (possibly also in daylight) there's skywave.

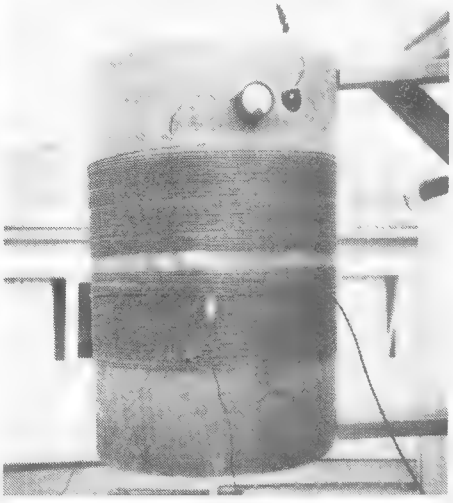
Above 200 kHz you will hear aeronautical beacons spaced about 3 kHz apart and below 200 kHz some foreign broadcasters can be heard, and further down the Omega navigation beacons including the Australian one in Eastern Victoria are on several frequencies between 10 kHz and 14 kHz.

Perhaps one day amateurs may get a small slice of LF as part of their official allocations, but in the meantime amateurs wanting to experiment in this part of the spectrum, at least in Australia, can apply for an experimental licence.

John Adcock said he was prepared to discuss LF with any amateur on the air and even put up a signal for those really interested.

Looking to the future he said personally he'd like to see a formalised amateur LF allocation about 3 kHz wide.

"It doesn't have to be a big band — you can do enough experimenting with a few kHz," said John.


John's loading coil.

Another thing he advocates is for amateurs to be able to apply for an LF permit which would allow them to use their amateur callsigns on the band.

For those further interested in LF operation John is planning to write a lengthy technical article about his experiments.

AR

Editor's Note: This is to be the title of a new series of articles, appearing from time to time like "Try This", but covering in greater depth any topics in which an experimental approach has produced useful results. The author of this, the first of the series, has promised others to follow, but readers are also invited to contribute if they wish.

THE EXPERIMENTAL AMATEUR

Lindsay Lawless, VK3ANJ
Box 112, Lakes Entrance, Vic 3909

Mobile Aerials — The Jenny Dipole

For those amateurs who want a go-anywhere aerial for car, boat, caravan or tent and the occasional stay at a holiday flat the following idea will be worth developing.

It is fairly easy to get the conventional helical to work from a metal vehicle such as a car, "tinny" boat or metal caravan. If your boat or caravan is GRP or timber there is a problem with the conventional helical monopole because of the absence of a suitable "ground plane" to provide a return path for aerial currents. If you can erect a dipole, vertical or horizontal, there is no need for a ground plane since the return path is via the dipole elements; so why not make two monopoles and in the absence of suitable metal structures connect these as a dipole?

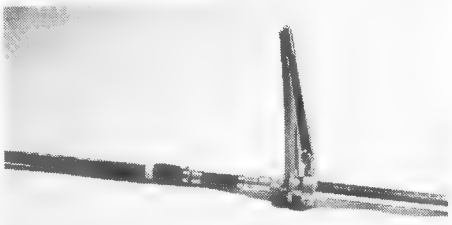
The Jenny mounted on the stern of the author's GRP boat. The mounting post was the stern light stanchion. It also serves as the bottom half of a 2 metre coax dipole.

I have made such a device and used it successfully on car, GRP boat and in the odd portable situation. The most attractive feature of the aerial is its odd legs, one much shorter than the other. (Naturally I have named it Jenny — no relation to Slim Jim). Either leg can be used alone on a suitable ground plane but of course the longer gives better results.

The shorter leg on the Subaru.

Close-up of the parts.

The photographs explain the basic idea and I believe the detail is best worked out to suit individual requirements; I have a small lathe which helped considerably to make the fittings and I will provide detail drawings of these if required. The shorter element is 360 mm long and the longer is 1300 mm. Both are tapered GRP fishing rod blanks (or parts thereof) and all fittings are brass.

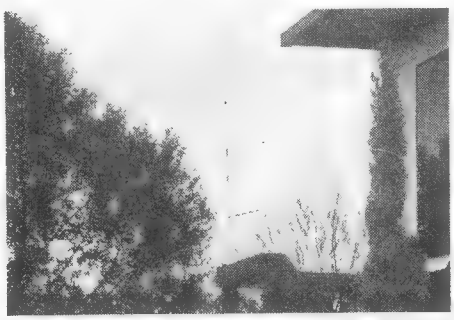


A close-up of assembly at the feed point.

An important part is the brass tubing mounting post: this provides the integrating mount and also shields the coax for part of its length to prevent surface currents and to ensure that the preferred (lowest impedance) path is via the dipole elements. With care in tuning adjustments the elements could be fixed relative to each other. I found it more convenient to have Jenny's short leg movable; the SWR can be minimised at each location simply by adjusting the angle relative to the longer element.

The aerial shown is tuned for the low end of the 10 metre band and this enables operation on 27.880 to 27.960 MHz, the inshore boating band. The only other aerial made so far operates on 40 metres but I am working on a multi-band version to cover 40, 20, 15 and 10 metres.

Jenny's longer leg installed on the Subaru roo bar.



On the balcony of a holiday flat.

AR

An Experimental Amateur Article will feature Satellite Tracking in the near future.

ELECTRONIC "MOUSE"

Desmond A Greenham, VK3CO
23 Stewart Street, Seymour, Vic 3660

This unit was developed some years ago primarily for the Jamboree on the Air (JOTA) where the "mouse" was hidden under a log or up in a tree and the Cubs and Brownies given the task of locating the hidden animal. Perhaps the game can best be described as a "Fox Hunt" using audio frequencies and ears as the sensitive receiver.

The "Mouse" is a small transistor oscillator built around a rocking armature telephone receiver. These are obtainable from disposal stores at a reasonable price. The receiver must be carefully opened by lifting the machine crimping around its perimeter. This can be done by using a small sharp screwdriver and angle wire cutters. Once opened, the receiver must be carefully dismantled, removing the terminal screws on the back. Inside, the receiver coil is wound in two sections, one on each pole piece. The wire between the two coils can be seen and this must be carefully cleaned using a razor blade. *Care must be taken* as it is easy to cut the wire accidentally or break the rocking armature mount. A small piece of fine covered wire is carefully soldered to the centre-point and extended outside the unit through a small hole drilled in the cover. This is the centre tap of the inductance as required for a Hartley oscillator.

Once the centre tap connection is made, the cover should be re-fitted, terminal screws replaced and the crimping re-tightened with large pliers or a light hammer. The unit should be checked with a multimeter to ensure that connection is right and the centre-tap is, in fact, in the centre. The resistance should be balanced on both coils and a click will be heard when checking each coil with a normal multimeter on the low ohms scale.

Wiring is quite normal and can be on vero board or a piece of old printed circuit board scrap. For the more competent operators, an etched printed circuit board could be easily developed.

The board is mounted on the receiver using the terminal screws, components fitted and wired, and a penlight cell holder fitted using Araldite or self-tapping screws.

With the values shown the "mouse" will "cheep" about every 30 seconds. If a faster "cheep" is required (a distinct advantage with younger children, less patient than their seniors) the value of R1 can be reduced to 25 k. With this value the "cheep" rate is reduced to around 5-7 seconds.

The transistor used, DS548, was chosen because of its availability and cheapness, but almost any general purpose NPN audio transistor can be used without changing any values.

The method of using the device is left to the constructor. Whatever rules of hunting are used, the kids will derive a load of fun from the "Electronic Mouse".

AB

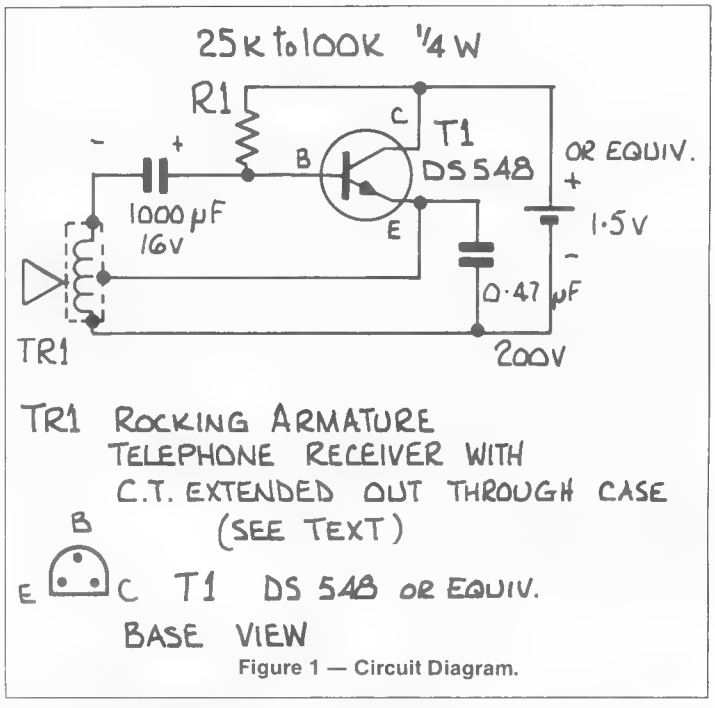


Figure 1 — Circuit Diagram.

BILL'S IN TROUBLE WITH THE GREMLINS NIGHT OUT

In December Bill Blitheringtwit was the victim of a savage shuffle whilst at the printers. Apologies to Ted Holmes and all readers.

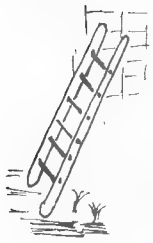
VAINS ANTENNA SERVICES PTY. LTD.

★ RADIO CONTROLLED VEHICLES —
★ INSTALLATIONS
★ ADDITIONAL OUTLETS FOR TV/FM
★ REPAIRS TO EXISTING SERVICES

ALL SUBURBS

★ PHONE FOR ADVICE
★ DO IT YOURSELF KITS
★ M.A.T.V. SYSTEMS DESIGNED & INSTALLED
★ TELESCOPIC MASTING & TOWERS INSTALLED

874 3333
13 McKEON RD., MITCHAM



"LADDER CRYSTAL FILTERS — INTERFACE WITH 'AMATEUR BUILDING BLOCKS'"

Rob Gurr VK5RG
PO Box 35, Daw Park, SA, 5041

Experiments with amateur radio applications of ladder filters continued throughout 1982[1]. A number of successful and acceptable configurations were developed and tested using the basic set up described in the earlier article. Practical demonstrations to interested amateurs was needed in the form of an actual working circuit. Previous experience with the "Building Blocks" promoted by Harold Hepburn, VK3AFQ[2], made the choice of this circuitry desirable — the IF (Unit B), described on page 18 of "Amateur Radio" August 1975, was a natural for amendments to include the new filters. A receiver using the RF and IF boards of this project was constructed.

Space on the IF PCB is adequate for a finished filter, where crystals are soldered to a smaller board within a shielded enclosure. During development, a slightly larger enclosure, mounted adjacent to the filter section of the IF board was used — smaller diameter coax cable was used for interconnecting to the 1 mm pins on the IF Board.

The only modification to Harold's circuit was the use of a 470 ohm collector load on the 2N3564 prefilter amplifier, following a discussion with that author. The additional capacity introduced by the coax cable leads (50 mm) was insignificant compared to the input and output capacity of the filter.

Two filters were found adequate, and although not completely developed for switching, no serious problems are anticipated. Figure 1 shows a filter which has been used successfully on CW, and, is also quite effective on RTTY.

Figure 2 shows a filter that has proved very successful on SSB, however some care with adjustments of the "phasing" condensers is necessary; I found the best way was to use the receiver calibrator, tune for the maximum audio output and align all circuits to this frequency. Following this, detune to zero beat and beyond until "other side-band", or "audio image" is at about 1 kHz the phasing capacitors C1 and C2, may then be adjusted for a null, which is quite sharp and easily perceived.

The "null" adjustments for C1 and C2 may be staggered, to notch out two specific frequencies. The "notional" bandpass characteristics encountered under such tuning arrangements almost eliminates the unwanted (asymmetrical) sideband.

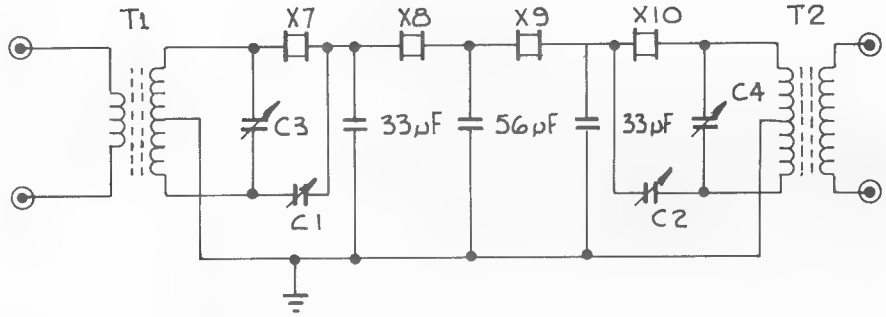


Figure 2 — VK5RG Crystal Ladder Filter No 2 (SSB) X7-X10 — 27 MHz or Similar Third Overtone Crystals used on 9 MHz fundamental C1, C2 are 2-10 pf, C3 and C4 are 6-60 pf. T1, T2, are ten turns trifilar 27 SWG approx on small toroid cores.

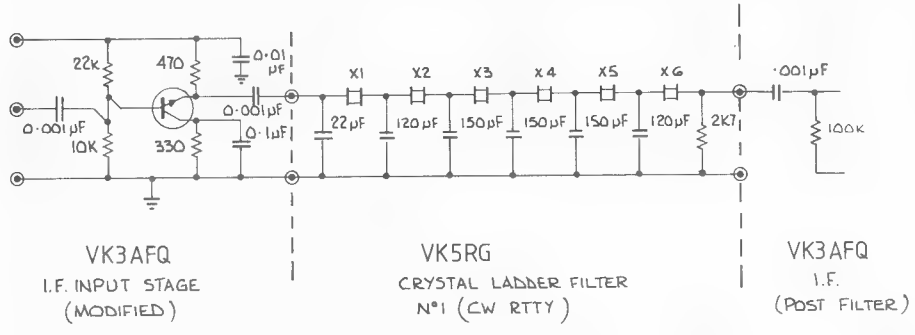


Figure 1 — X1-X6. 27 MHz or Similar third Overtone Crystals used on 9 MHz Fundamental.

GENERAL

The main factor about these experiments is that the accuracy of the values of shunt "C" used in the various sections is not critical —some articles are prolific in mathematical calculations that are made redundant when the author finally uses preferred 10% values. Values used in the various overseas articles also vary by up to 100%.

With respect to crystal frequency accuracy, the preference is for those within 30% of the filter bandwidth, ie at 9 MHz for a 2 kHz bandwidth they must be within 600 Hz of one another. A handful of crystals from a local distributor showed all to be within this tolerance.

A development 14 MHz SSB DX receiver using the filter shown in Figure 2 has been assembled. In typical amateur fashion it will never be finished — possibly traded by now for parts for my next project.

REFERENCES

(1) "Single Frequency Crystal Ladder Filters" by Rob Gurr, VK5RG. Amateur Radio, November 1982.

(2) "Amateur Building Blocks" by H L Hepburn, VK3AFQ. Amateur Radio, July 1975.

Some useful references and construction information:-

Making Crystal Ladder Filters	G3VA	Radio Communication	September 1976
Some experiments with High Frequency ladder crystal filters Part 1	G3JIR	Radio Communication	December 1976
Some experiments with High Frequency ladder crystal filters Part 2	G3JIR	Radio Communication	January 1977
Some experiments with High Frequency ladder crystal filters Part 3	G3JIR	Radio Communication	February 1977
Some experiments with High Frequency ladder crystal filters Part 4	G3JIR	Radio Communication	September 1977
Ladder crystal filter design	G3JIR	Radio Communication	February 1979
Crystal ladder filters again	G3VA	Radio Communication	June 1977
Carrier frequencies and SSB	G3VA	Radio Communiction	August 1977
Crystal ladder filters	F6BQP	Wireless World	July 1977
Some experiments with high-frequency ladder crystal filters	G3JIR	QST	December 1978
Ladder crystal filter design	G3JIR	QST	November 1980
Systematic design of crystal ladder filters	N7WD	Ham Radio	February 1982
Ladder filters	ARRL	Handbook	1982
Unified Approach to the Design of Crystal Ladder Filters	ARRL	QST	May 1982
Crystal Ladder Filters	"Electronic Communications Systems" by George Kennedy		
Single Frequency Crystal Ladder Filters	VK5RG	Amateur Radio	November 1982
Variable Bandwidth Crystal Ladder Filters	G3VA	Radio Communication	October 1982
Filter with TV Crystals	G3VA	Radio Communication	September 1980

AR

QSP

AMATEUR RADIO RESTORED

The national Amateur Radio Society of Poland, the Polski Zwiazek Krotkofalowcow (PZK), has informed ARRL, the Headquarters Society of the International Amateur Radio Union (IARU), that all amateur radio activity in that country has been restored. According to a letter written by SP8TK, Secretary of PZK, as of 1st October the Ministry of Telecommunications has returned amateur radio licenses and transmitting equipment to their owners. "This ends fully the period of suspension of amateur radio activity in Poland, which started on 13th December, 1981 with introduction of martial law."

from ARRL Letter, Vol 2, No 22

AR

TV INTERVIEW — Theme Amateur Radio

Neil Penfold, VK6NE

388 Huntriss Road, Woodlands, WA 6018

Mount Lawley Technical College in WA conducts courses for Technical and Further Education (TAFE). For experience on a TV course the students stage a production titled "Thursday Conference".

Recently amateur radio was the theme of one session and the student interviewer, Ivan, had Jim VK6RU, David VK6WT and Jill VK6YL as his guests.

The TV set.

The course director was Alan VK6PG, who arranged the production which took thirty five minutes to tape.

Action.

The many facets of amateur radio were covered ranging from its history, through its structure and organisation, DXing, QSLing, fox hunting and showing some early model radios.

The interview. L to R: Jim VK6RU, Ivan, David VK6WT and Jill VK6YL.

Photographs by Neil Penfold.

AR

JAMBOREE ON THE AIR

Chris Bentley, VK4ABM

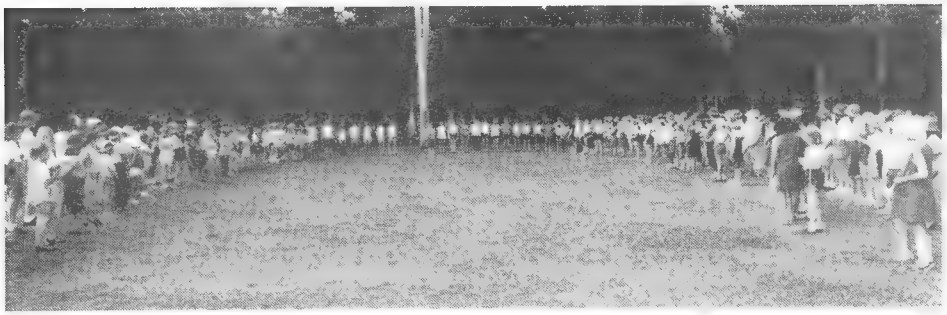


Photo by Bob VK4BOB

JOTA came around again on 15th and 16th October. Once again many amateur radio operators were able to share their hobby with Scouts and Guides from all over Australia and the world.

Bob, VK4BOB, was just one of the many amateurs who took on the responsibility of setting up a portable radio station for the occasion. Due to failing band conditions this year, it was Bob's decision to transport his entire shack to Camp Warrawee, near Petrie, 30 km north of Brisbane.

The station comprised an Icom 701 transceiver, a Yaesu FLDX2000 linear amplifier, an Apple II computer and monitor for RTTY and a Kenwood 7600, two metre rig plus all the extras such as microphones, headphones not to mention the rotator. Bob dismantled his VS33 three element tri-band antenna and 40 ft wind up tower and toted them along.

It took about two hours to set up the portable station at Camp Warrawee. Second operator Mick, VK4AMB went along for the ride and the third member of the trio, Chris VK4ABM, timed her arrival to miss the heavy work. A group of Rangers were roped in to hold the guy wires when hauling up the tower. The Rangers assistance was invaluable and they were cheerfully on hand to help in the tricky business of lowering the tower on Sunday afternoon.

There were about 200 Brownies, Guides and Rangers at Camp Warrawee plus about 150 leaders. It was a surprise to see so many leaders present, apparently the Guiding rule book states that there must be one leader for every six guides present at a camp.

Bob's portable station was on air by 0000 UTC on Saturday morning and it was run almost continuously until 1700 UTC on Sunday morning. It re-opened at 2030 UTC on Sunday and continued operation until mid day when it was necessary to close down and dismantle the gear.

Sixteen different countries were contacted, mostly on 20 metres. Perhaps more importantly, a majority of the contacts were solid contacts, enabling the QSOs to continue for up to two hours at a time thus giving many of the girls an opportunity to participate in two way conversations.

Most of the girls knew nothing of amateur radio but they were surprisingly keen to learn about this means of communication. All day the station operators were surrounded by groups of girls with seriously intent expressions on their faces, each patiently waiting their turn for an opportunity to speak on the radio.

All the 200 girls in camp were able to qualify for their JOTA Badge for 1983 to demonstrate the fact that they had taken part in the day's activities. Many of the girls were able to take an active part, others were content to look on and listen.

The Rangers deserve a special mention, they were truly enthusiastic after some initial shyness. It was these older girls who kept the station on air until 1700 UTC. The RTTY proved a popular method of communication with the Rangers who were all interested in typing out messages for transmission. In a contact with ZM3MA and some Kiwi Venturer Scouts addresses were exchanged for future pen pals.

The guide leaders provided a full programme of camping activities for the girls. This included cooking lunch on a floating raft (which sank!!) for the Rangers and building a model of ET for the Brownies.

One thing impressed the amateurs as visitors to a guide camp, namely how well behaved all the girls were. It was just magic to watch the senior leader gain control of 350 people (not by shouting or blowing whistles) but simply by raising a hand and waiting for silence. It worked every time.

Photo by Bob VK4BOB

A Brownie Leader and Brownies.

It was a great priviledge to share our hobby with the Guides. Even though it was hard work, especially when one considers the time spent assembling the gear, not to mention reassembling it back at the home QTH. It was tiring too, keeping up with a seemingly endless supply of girl guides. However, when one remembers the sheer fun and laughter and the expressions on the children's faces it was all so very worth while.

AR

Photo by Mick VK4AMB

Bob VK4BOB operating on HF surrounded by a group of Girl Guides.

RTTY: A WINNER AT JOTA 1983

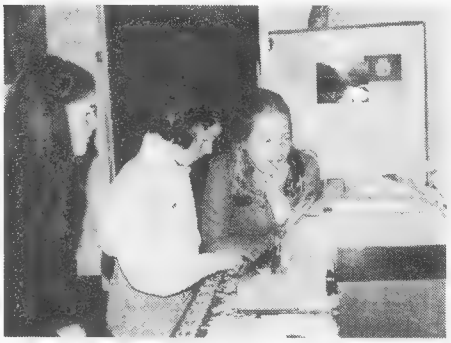
Terry Fraser, VK3RT
50 Lenna Street, Burwood East, Vic 3151

Anyone who is involved in JOTA will know that plenty of action and variety is needed if one is to hold the attention of Scouts and Guides over a weekend. With this in mind, Terry VK3RT and Ian VK3YRR set out to JOTA with the 1st and 4th Mitcham Guide Units. Not having enough time to arrange fox hunt gear or electronic projects etc, we turned to the pleasures of RTTY. Into the station wagon we loaded a Siemens Mod 100 for 2 m, a Microbee Glass System for HF, and a Model 15 Printer and Model 14 Tape Reader for printing on local loop.

The Guides mastered RTTY procedure in no time at all. While a microphone pushed under a nose can be an intimidating experience, the familiar layout of a teletype keyboard seemed to be less threatening. The girls with typing experience found it a breeze, those who were hunt and peck typists only needed to be reassured that the operator at the other end was just as slow and fears disappeared. The mechanical printers were placed at opposite ends of the building and out of visual contact. During phone operation the printers were connected on local loop. The girls typed to each other and used the familiar KKK at the end of message. Typing on local loop between the machines proved to be one of the most popular activities.

Most eyes are on the Siemens Mod 100 as "Fred Flintstone" is printed on the local loop.

While HF and VHF were in operation the Model 15 Printer and the Model 14 Tape Reader continued to churn out endless RTTY pictures. As the picture was forming the Guides held a "guess the picture" competition. Whoever correctly guessed what the picture was, won the picture. The old teletype gear ran all weekend without a hitch. I have always regarded the Model 15 as a sturdy boat anchor that has the ability to print messages. The Guides it seemed required a practical demonstration of such ruggedness. As it was printing yet another copy of "Fred Flintstone",



In contact with John VK3CJM on RTTY 2 metres.

I failed to see the excessive number of girls perched on the edge of the table on which the model 15 was sitting. An extra guide joined the others and an interesting lesson in moments of force took place. To my horror I watched the table with printer, still typing dutifully, tilt at an alarming angle. With deafening squeals, all the Guides leapt off the table simultaneously. Crash!!! I hurried over to inspect the printer and found, in true teletype tradition, it hadn't missed a beat.

Finally at 2 AM loop current stopped flowing and 40 Girl Guides bedded down on the wooden floor of the hall. There was no doubt that RTTY, both on the air and on local loop was a winner.

Ian VK3YRR demonstrating Glass RTTY on HF.

A thankyou letter was received from the Mitcham Guide Units saying how much they had enjoyed RTTY so I think we will be back again next year.

AR

QSP

NO MORE LOGBOOKS IN THE USA?

Routine log-keeping by radio amateurs in the USA has been abolished. The FCC noted on 26th May that ". . . there is no longer an official need for records of routine station activity", although specific individual stations could be required to keep logs if necessary.

from RadCom November, 1983

AR

LICENCE RENEWAL

Are you quite sure that your amateur station licence is current? Recently, a very well known amateur had his callsign reallocated. The new recipient phoned the previous holder to see if there was some mistake.

At first, it was thought to be the fault of DOC, but not so. The station licence had not been renewed and had therefore been cancelled.

All ended happily, however, the new licensee relinquished the call, was issued a new one and the original holder got it back again.

DOC had apparently not sent a renewal notice each year but the onus is on you to make sure that your licence fee is paid by the due date.

Amateur Operator's Handbook, Revised (Dec '78) paragraph 4-16 "A written notification that an amateur station licence is due for renewal will be sent . . . However non receipt of such a notice does not relieve the licensee of the obligation to pay the renewal fee . . . A licence that is not renewed by the due date shall automatically lapse." *Check your drivers licence while you are about it!*

Station licences in the amateur service are now $19.00 per annum as of 1st September, 1983. from QTC November 1983

AR

VISITOR FROM VU TO RSGB

As a result of a visit to RSGB HQ by an official from the National Institute of Amateur Radio, which is a prominent radio society in India, some interesting facts about amateur radio in that country have emerged. The son of India's Prime Minister, Rajiv Gandhi, holds the callsign VU2RG, and his Italian wife is also licensed. There are some 2500 amateurs and three types of licence in India: Class 2 requires 5 WPM CW and permits the use of 50 W; Class 1 allows higher power and requires 12 WPM CW, and there is also an Advanced licence. Although NIAR is not the IARU-recognised national society, they appear to have good relations with their licensing authority, although only possessing 300 members. Interestingly enough, the institute possesses ten staff — at one staff member per thirty members, one imagines that the RSGB would provide quite good service . . . The institute is also financed by a 75 per cent grant from the Government, apparently because of the excellent work performed by radio amateurs under emergency conditions. from RadCom November, 1983

AR

REACTIVATION OF AMATEUR RADIO IN KAMPUCHEA

Kampuchea, back on the air after an eight year absence, has brought interest from far and wide. This adapted article is intended to convey some of the trials and tribulations of returning this prefix to the airwaves.

In early February 1983, Mike JH1KRC met with Yoshi JA1UT and decided to attempt amateur radio operation from XU. Both men are helping at the Association of Aid for Indo China Refugees (AAIR) in Meguro, Tokyo. Mike and Yoshi had been acquainted with each other since they, with friends, activated 8Q7BI on all bands in 1981.

The AAIR were working toward the establishment and construction of Tokyo Village in Ampil and Nippon Village in Obbock, Kampuchea which were to be used as rehabilitation and resettling areas for Cambodian refugees

The AAIR was campaigning for funds for these villages and it was on Mike and Toshi's instigation that the hobby of amateur radio should become involved. The idea was put forward and received the blessing of the Kymer People's National Liberation Front (KPNLF) under the leadership of their president Mr Son Sann. Mr Sann is also the president of the Coalition Government of Kampuchea.

By the end of April, agreement was reached with Mr Sann, who was most enthusiastic that amateur radio would be reactivated in the KPNLF villages. Mike and Yoshi were joined with eight more JA operators including Ang JA1HQG, one of the directors of JARL.

In early May, Yoshi and Ang had a chance to cross over the border between Thailand and Kampuchea to visit the Ampil Village where they had the opportunity to meet Mr Sann for the first time. Their visit was for only three hours, due to the hours that the border guards were on duty, but they had accomplished what they had come for and the project was now able to be publicised by the media.

In June Mr Sann visited Japan which enabled Mike and Yoshi to discuss the finer details of the plan, also to offer the donation of brand new and secondhand amateur equipment. Most of this equipment was donated by individual amateurs and various radio clubs in Japan.

By the middle of July the names of ten Japanese operators were presented to the Thai government, so that border passes may be established for them. At this time as much of the equipment as possible was boxed, so that it could be forwarded ahead of the initial group of five who were to depart on the 7th August, however the five still had plenty of heavy hand luggage.

This group comprised Yoshi JA1UT, the co-ordinator, Mike JH1KRC, who was to act as teacher and operator, Ang JA1HQG, the QSL Manager who afterwards was to have the unenviable task of sorting out the logs, Mitty JE1OMC also ex WA2EPV who was attached to AAIR, and another Yoshi JK1KHT, a skilled engineer.

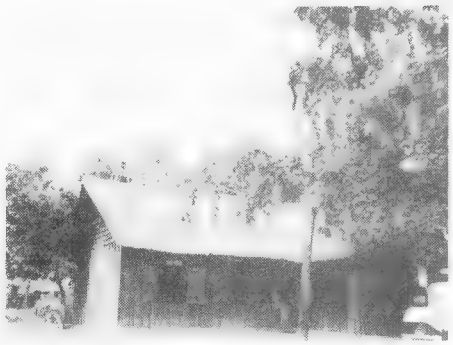
It must have been a strange sight to see five Japanese tourists land in Bangkok that evening with an assortment of heavy luggage, cartons and boxes. Next morning this assortment of luggage, the five operators and the licencee of XU1SS Son Soubert were loaded and ready for the five hour journey to the village.

The first person to greet the contingent at the village was Mr Chak Bory, now the President of the Khymer Amateur Radio Associations. He advised the group that some transceivers had arrived, which was a relief as it would have been a virtual impossibility to get transceivers through the Thai customs. The group made a quick tour of the village as they had to return to Thailand before the border closed at 1700 local time. The border was only open between 0800 and 1700 hours each day, so there would be no night time operation from XU1SS in the initial stages.

The nearest control gate is a few kilometres away from the entrance to the village, and the group stayed in a hotel at Aranyaprathet, the largest town in the area, which is about 230 kilometres from Bangkok and about seven kilometres from the border post. This hotel rates were in the order of 150 Bhats (20 Bhats = $A1.00) for a room with a double and one single bed. The town supported a number of Chinese merchants and restaurants of excellent cuisine, of which the group dined at most evenings with rates in the order of 20% of those in Tokyo. Mike remarked that they were generally full up to the "lips".

The trip to the village, each day about 70-80 minutes travelling time, was a pleasant trip passing many humble villages and rice fields scattered amongst the woods. Mike recalls that the only "Stop Signal" generally encountered were heards of cows, where one slowed down. As one passed through five "control gates" enroute you said "Kophun Kap" which when interpreted means "good day".

At the last control gate passed through there was a fully loaded heavy machine gun trained on the roadway. One stopped the vehicle that they were in and presented their passes to the young guard soldiers, who generally wrote something in their note books and then spoke on a field type telephone to someone probably higher in command. They then said "Kophan Kap", and the group would return the greeting with their hands clasped in front of their face as if in prayer. They were then allowed to pass on towards the village.



The antenna and rotator above the shack.

The radio shack was located in an administration area, not in the refugee camp, showing that the authorities took the project seriously. Work began, and with the help of young men similar in age to Mike (26), the erection of the TH3Jr and roof tower began and the FT-77 plus FL2100B linear were in place by 1400 hours. Mr Bory then invited the Japanese helpers to a sumptious lunch of Kymer curry and soup, fish (that had heads like snakes), eggs and rice. This created a problem as they were very aware that food was at a premium and they felt that they were depriving the needy of sustenance.

After lunch, Mike commenced the class with the eight initial members that would activate XU1SS and XU1KC, but within a couple of hours, time was up as it was necessary to pass back through the border control before it closed. Activating the airways would wait until the next day!!!

Teachers, pupils and Mr Sann.

The next day, 10th August, everything was ready for commencing operation after a number of photographs had been taken with Mr Sann in front of the "shack" prior to his leaving for the United States of America. At 1255 local, 0555 UTC, XU1SS began operation by Yoshi calling CQ on 21.295 MHz. After

several trys and remarks from stations to QSY as the frequency was occupied at 0558 UTC Yoshi was answered by JA6GRX. Mike required the students to at least exchange name and QTH at this stage of their education to get used to normal QSO operation. Then the multitude came from nowhere with the next signal recognised from JA1ELY. The third contact was with VK1WB. It was found that the most expedient way to operate was for one of the JA operators to take the call and then passed it over to the student for his QSO. Kampuchea was at last activated after eight years of absence.

Practical instruction.

Operating continued in this fashion, mostly with propagation into JA, a couple of KH6s and one USSR station, a QSO that needs relating. Apparently the USSR contact went like ". . . my name is Vlad, Victor-London-Alabama-Denmark . . ." All the XU operators exploded into laughter remarking that their pronunciation sounded funny. The XU operator replied "... OK, Vlad, your name very strange to me! Well . . . Good bye and see you later . . . This is Egg-sh-ray-Uniform-One-Sharraa-Sharraa . . ." and phonetics had been found.

XU operators have some strange pronunciations of various words perhaps it comes mainly from their mother tongue, and partly from the French that they learned at school many years ago. The first days operation ceased at 0930 UTC with 94 contacts being entered in the log, all on the same frequency, as it was time to leave, to cross the border again. The "shack" was secured and guarded by soldiers.

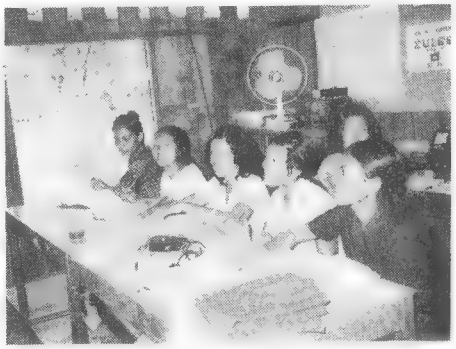
Next day, XU1KC came on frequency as well as XU1SS and the pile up was enjoyed by all but particularly by the Japanese, where the best propagation seemed to lay. The education programme was continued by Mike covering topics such as identification, QSLs and the manager, RST reports, writing the log, propagation, split frequency operation, the phonetic code, Q code abbreviations and how to work the maximum number of stations in a limited period. At times these lessons occupied up to six hours per day, meanwhile Mitty JE1OMO operated the practical side of the hobby at a good pace.

The first JA group, except for Ang and Mike returned to Japan on the 13th August. Whilst awaiting for the second contingent of helpers to arrive, the XU operators had many more QSOs and developed the art of holding a QSO for a longer period. Propagation was good and many countries were worked. The XU group were elated to work BY8AA and break him away from a JA pile up.

The second group joined the XU "teach in" on the 16th August and these included Yuh JF1GKF and Setsu JL1UXH. Two days later Ang JA1HQG left for home. Ang's callsign was as well known as the XUs as it had been repeated many thousands of times because of his QSL responsibilities.

Everyone had settled into a pattern and progress was good. The Japanese operating instructors were often invited to lunch with the vice-president of the KPNLF, General Dien Del, who lived next to the shack. Lunch was specially served accompanied with his hidden stocks of Camembert cheese and French red wine which were gifts from travelling dignatories from France.

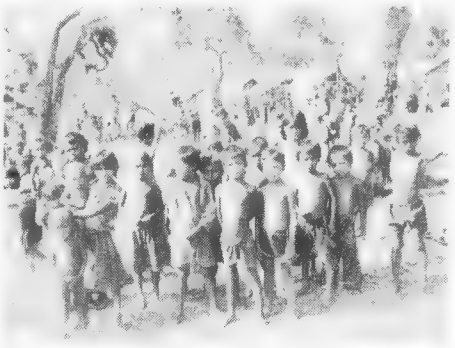
General Del, a stern, strict man, was very generous and helpful to the instructors and at his request they trained six YL operators. Some of the YLs had learned CW at the Transmission Office as some of the OMs had, but they were very shy and took a lot of coaxing to say goodbye and 88 at the end of their QSOs.



The YL Class of '83.

The XU operators, as Mike writes, are very intelligent people, with many having graduated from technical and administration schools, others were officers of the former government, before the liberation, that had escaped the capitol and wandered in the jungle with little or no food. Mao, one of the operators, smilingly remarked to the group that "I managed to walk with a stick, and looked like a skeleton".

The chief operator Nou and Phal, who had an excellent command of the English language, took the Japanese on a tour of the villages at Ampil where some 36 000 people are located. The area is divided into seven residential areas and Village #7 is known as Tokyo Village. This village was donated and maintained by the Japanese people through AAIR.

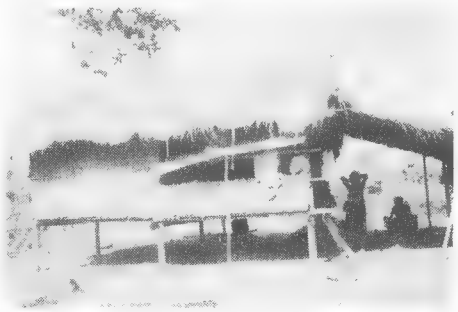


Some of the children in front of the camp.

At Village #4, they were shown 7000 recent new arrivals from deep inside Cambodia. These people cut down the jungle to make houses for themselves. The children living here were usually scantily clad or running around naked as the clothing supply is inadequate. All are invariably barefoot.

When Ang, went to take photographs with his telephoto lens, the children were very afraid and at one time someone shouted "escape or you will be shot". Mike relates that it made the group very miserable to see that children of five and six years old have a sense of being 'shot' with a gun and he saw a boy holding his sister in his right arm, as his left arm had been amputated. Once these children realised there was nothing to fear they were always around watching and smiling.

A Woman's Association has been established where the ladies can learn to sew with a machine and to spin and weave pure silk into a cloth, which can give them an adequate income. Some of the women work as well as the men, going into the undergrowth to cut the reeds to make the walls and roofs of their new homes which they are skillful enough to build with little help.



A typical home built by the refugees.

Mike had to leave the operation on the 20th August to return to Japan and to that time some 7000 contacts were made. Another operator, of six metre fame, was Hide JH4RUG, who organised the operators to work some 400 stations in less than three days.

Since returning to Japan they have the opportunity to speak to their new found friends in the village by radio. At the time the article was written there were some twenty XU operators, the first ones teaching newcomers, seven being YLs and their programme was, Weekdays — 0200-0400 UTC English lesson. 0700-0900 UTC Training in CW. 0900-1400 Operation Sundays 0200-0500 and 0700-1400 UTC Operation. They use 7.015, 14.030 and 21.030 MHz on CW with 14.195 and 21.295 MHz on SSB.

Mikes makes a plea that if anyone anywhere can help with books on theory of electrical and electronic equipment, amateur radio, awards, contests and anything that may be useful to assist their progress please send them to Khmer Amateur Radio Association — Ampil, C/o KPNLF, PO Box 22-25, Ramintra, Bangkok 10220, Thailand. Any gift will be greatly appreciated.

Adapted by Ken and Bett McLachlan
from an article written by Mike Watanabe, JH1KRC

Photographs courtesy of Ang JA1HQG.

AR

NOVICE NOTES

Ron Cook, VK3AFW
TECHNICAL EDITOR

The FET — a Valve without a Vacuum?

Those novices who have had a long interest in radio and have acquired their licence at a mature age no doubt feel very much at home with vacuum tubes or valves such as the 5Y3, 6V6, 6J5 or the later devices such as the 6BA6, 6BE6, 6AL5 etc. In many ways the Field Effect Transistor or FET resembles a vacuum tube. Furthermore the FET in various forms is displacing the bipolar or "normal" transistor because of its superior characteristics. Old timers may feel a degree of satisfaction about this.

JUST WHAT IS A FET ANYWAY?

Fig 1 illustrates the typical construction of an n-channel diffused FET. The manufacturer starts with a piece of p-type semiconductor material, usually silicon, cut from a single carefully grown crystal. He masks off the edges and exposes the central area of one surface to a stream of a selected element. This produces a dish-shaped volume of p-type material. In n-type material electric currents are carried by electrons moving through the structure. For pure silicon, adding arsenic, antimony or phosphorus in very small quantities will produce n-type material. Adding aluminium, gallium or indium would produce p-type material in which electrical conduction is by means of movement of "holes" or atoms deficient in one electron. Silicon without any added impurities is

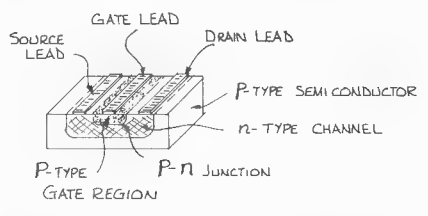


Fig 1. Illustration of construction of n-channel diffused JFET.

"intrinsic" and called i-type material. (Hence PIN diodes — but I digress.)

By masking off all except a strip across the centre of the n-type dish a p-type region can be formed to give a structure as in Fig 1. Aluminium electrodes can be spattered on to form electrodes to which wire leads are welded, or perhaps we could say micro-welded.

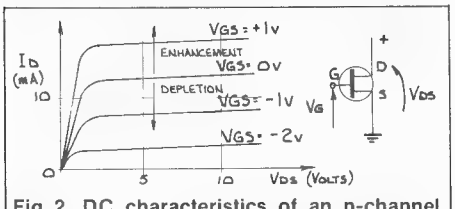


Fig 2. DC characteristics of an n-channel JFET.

Fig 2 shows the DC characteristics and symbol of an n-channel junction FET or JFET.

Applying a positive voltage to the drain causes a current to flow which at first increases with increasing drain voltage but quickly settles to an almost constant value — just like a pentode! If the gate-to-drain voltage is varied the drain current varies in sympathy. For a 1 volt variation a typical change of 2 to 10 mA may occur.

Thus typically a JFET may have a transconductance, or GM of 2 to 10 mA/volt. The current may be increased or decreased above the zero gate-source current — enhancement or depletion.

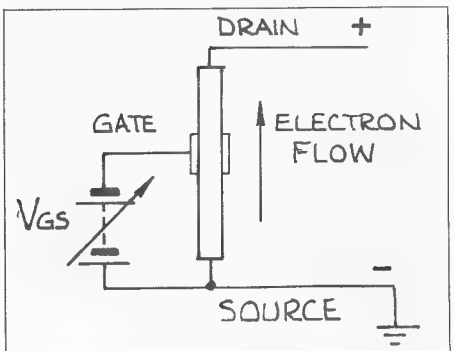


Fig 3. Schematic illustration of gate action in an n-channel JFET. Note pinching-off of electron flow due to negative gate voltage.

Fig 3 shows a simplified view of a FET. The drain and source are connected to opposite ends of a rod of n-type material. The gate is a ring of p-type material around the centre of the rod. If no voltage is applied to the gate electrons can flow through the rod from the source to the drain. If the drain voltage is increased the current increases until a critical electron density is reached and the current is then almost independent of the drain voltage.

Applying a negative voltage to the gate repels electrons in the vicinity of the gate. If the current density is to remain the same, because the area available for the current to flow through is reduced, the drain current must decrease. The current density does remain the same in the pinched-off region as it was before the gate voltage was made negative. Thus the gate voltage can control the drain current.

To make a practical amplifier the components shown in Fig 4 are added. Firstly we need a load resistor to develop our output across. This is RL and may be a meter, a following stage, an earpiece etc. The voltage is generated across RD by the fluctuating drain current. To isolate the DC across RD

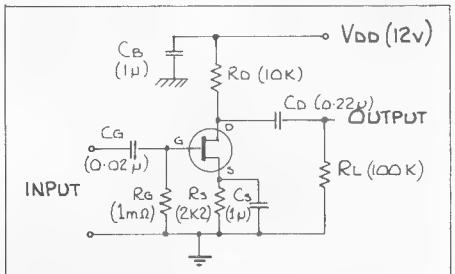


Fig 4. Simple JFET audio amplifier. Typical values of components are given in brackets.

from RL a coupling capacitor CD is used. It needs to be large enough to carry the lowest frequencies to be used.

Self-bias may be employed by using a suitable source resistor RS. It can be selected to give an appropriate DC voltage across the FET for linear operation. A bypass capacitor CS is used to prevent RS reducing the AC gain by negative feedback action. CS must have a low reactance at the lowest audio frequency to be used.

A high value gate resistor RG may be used to provide a DC path for the gate bias. Only a very small leakage current flows through RG. A coupling capacitor CG completes the circuit.

A supply bypass capacitor CB may be useful.

Other types of FET devices are in common use. For example the gate can be made by using a metal foil insulated from the channel region by a very thin silicon oxide layer hence the Metal Oxide Silicon FET or MOS FET. MOS FETs have a very high DC input resistance and can be damaged by static electricity generated on clothing, carpets, plastic bags etc. Some MOS devices have zener diodes connected across the gate to source for protection.

A well known MOS FET configuration uses two gates. One can be used for gain control and the other for signal input. They make excellent RF and IF amplifiers and mixers.

A recent innovation is the V MOS FET. This is an MOS FET with a Vee shaped gate. This increases the area of the gate without increasing the distance between the drain and source. Thus high gain at high frequency can be obtained. By extending the Vee and structure along the plane at right angles to the Vee the size of the transistor can be increased without increasing the current path length. Thus higher dissipation is possible without reduced HF performance. Typical V MOS FET construction is given in Fig 5. V MOS FET RF amplifiers are now a commercial proposition for HF and VHF. A single transistor can generate 50 watts at 30 MHz or 20 watts at 160 MHz. A typical 28 MHz linear amplifier

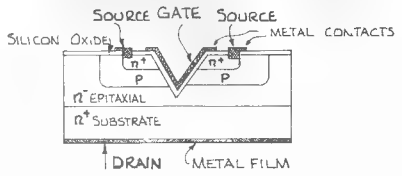


Fig 5. V MOS FET construction.

A recent development in construction of FETs which allows generation of 50 watts at 30 MHz and 20 watts at 160 MHz with a single device. Operating voltages and currents are higher than for ordinary FETs. The Vee shaped gate gives a large gate area which can be increased by extending the length of the groove. The V MOS FET operates like a low voltage high current vacuum tube! Typical drain currents are 2 A for a supply rail of 36 volts; maximum device dissipation may range from 1 to 125 watts or more.

using a V MOS FET may draw 2 A peak when operated from a 36 V supply.

The power gain of V MOS FETs is high as they are a voltage operated device and consume very little gate power. Except for the lower supply voltage and higher current some V MOS FETs are approaching the level of performance of a 6146. Of course there is no need for a heater or a screen supply. Oh yes then the gm is typically 200 mA/V which makes even the best vacuum tube look rather weak.

Several overseas journals have carried descriptions of amateur band V MOS FET linears so hopefully we will soon see details of one in AR. The 1982 ARRL handbook has details of a low power (6 W) CW V MOS FET HF transmitter that could be built over a weekend.

73 de VK3AFW

References
1 Amateur Radio and Electronics Study Guide, Ian Ridpath ZL4BCG
2 The Radio Amateur's Handbook 1982 Ed, ARRL.

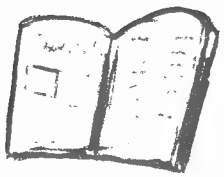
AR

VHF Communications

1984 SUBS

Airmail $13.20

Surface $9.00



MAGAZINE REVIEW

Roy Hartkopf, VK3AOH
34 Toolangi Road, Alphington, Vic 3078

(G) General. (C) Constructional. (P) Practical without detailed constructional information. (T) Theoretical. (N) Of particular interest to the Novice.

RADIO COMMUNICATION. NOVEMBER 1983. Annual General Meeting.

VHF COMMUNICATIONS. SUMMER 1983. Mini SSB 2 m Transceiver (P). Synthetic Colour Module (P). Pin-Diode Switching. (P).

HAM RADIO. SEPTEMBER 1983. Linear Translators (TG). Effective Ground Systems (G).

CQ. SEPTEMBER 1983. 1982 World Wide DX Phone Contest (G). 1983 World Wide DX Contest (G).

CQ. OCTOBER 1983. 1982 World Wide DX CW Contest (G). All time contest records (G).

ORBIT NO 14. JUNE 1983. Tracking satellites, Telemetry Beacon Demodulator, Computer software. Antennas. World Wide Satellite Activity.

73 MAGAZINE. NOVEMBER 1983. Variable Frequency Audio Notch Filter (C). Specifications for receivers and definitions of terms with a computer programme (NG). Six metre VFO (P). FT 101 Modification (P).

AR

TRY THIS

J A Heath, VK2DVH
12 Wilga Street, Blacktown, NSW 2148

ALIGNMENT OSCILLATOR FOR 455 kHz

The circuit is shown of an oscillator on 455 kHz nominal centre frequency using a ceramic resonator type CSB 455 E or similar.

The oscillator will work from a 3 V to 12 V supply and gives a very clean sine wave output.

The author used it to line up a 455 kHz IF but it may be adapted for other uses.

AR

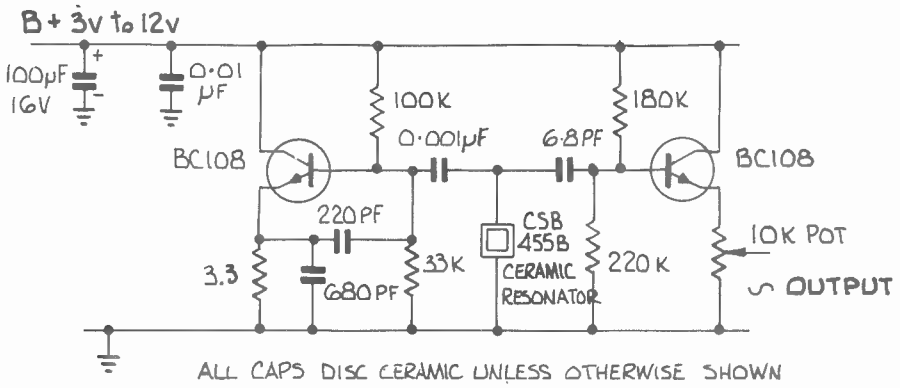


Figure 1 — Circuit Diagram.

SUPPORT YOUR ADVERTISERS Remember to say you saw their ad in AR

BALLARAT AMATEUR RADIO GROUP AND WORLD COMMUNICATIONS YEAR

Dick Forrester, VK3VU/A35RF
Box 600, Ballarat, Vic 3350

In the period 1980-1982 I had the opportunity to visit the Kingdom of Tonga in the South Pacific. This idyllic location seemed to be a perfect place to operate from so I took the opportunity to obtain a licence and unleash A35RF on the DX world. When the bands were in good condition I was able to have thousands of QSOs on 10 m with a dipole and an FT-7. As conditions worsened I graduated to an IC-720A and the lower bands.

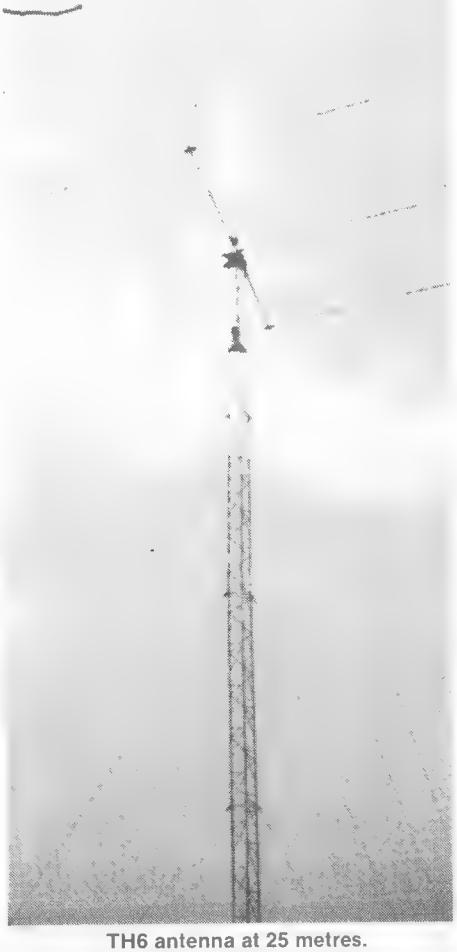
Willing helpers manning the jin-pole.

One evening while having dinner with John Lee A35JL I was surprised to discover that there was no mechanism for local people to sit an examination and obtain an Amateur Transmitting Licence. It seemed that the only way to obtain permission to operate on the amateur bands was to submit a valid overseas licence and then operate under reciprocal conditions. This of course prevented anybody who lived locally from obtaining a transmitting licence unless they were able to travel overseas. For the majority of the population this would almost be impossible. There was also the problem that there was no technical instruction suitable for budding amateur operators. Incidently, the same problem occurs in Western Samoa (5W).

Erecting the tower which came from the T and T Department for a nominal fee.

John had already had discussions with the Telephones and Telegraph Department but nobody had any real idea in which direction to go, especially since a number of the decision makers had very little interest in amateur radio. I then suggested to John that perhaps I could help by furnishing copies of the Australian syllabus for both Novice and Full Call examinations along with a quantity of study material. Armed with this information he would then be able to present an informed case to the relative authorities. At this stage it was pointed out that since a lot of inter-island traffic was sent by hand Morse a pool of trained operators might not be such a bad idea. People began to take notice.

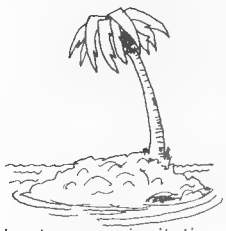
When I returned to Australia in April I put it to the Ballarat Amateur Radio Club meeting that it would not be such a bad idea if we could assist the Tonga Club along the lines outlined above, as our contribution to World Communications Year. They agreed and study material, text books, lesson outlines, Morse keys, oscillators and sundry items were on their way. The net result is about six qualified Tongan nationals being able to operate the club station in Nuku'alofa (A35AA). The station consists of an FT-101B, FL-2100B and a TH6 at 25 metres. Low band antennae are provided and the station will be available to visiting amateurs. The technical staff of the National Radio Station A3Z provided the much needed technical expertise and guidance.



TH6 antenna at 25 metres.

I would like to thank all the BARG members who helped with material and time and the BARG committee who helped me with the postage. I think it is a worthwhile project for the Ballarat Club and we are all very pleased that we were able to personally be involved in World Communications Year. After all, that is what this hobby is all about.

AR



HOW'S DX

Ken McLachlan, VK3AH
Box 39, Mooroolbark, Vic 3138

Last year an invitation was extended to Jim VK3YJ to write the first column for 1984.

Jim is a devoted DXer, antenna experimenter, contributor to this column and AR who spends countless hours monitoring the bands for elusive DX calls whilst he is writing the monthly Australian news segment which appears in Wayne Green's W2NSD excellent publication 73.

Jim is ably supported by his XYL Anne, who has had to dust the cobwebs off the typewriter to assist with all his pursuits of late.

1983 WORLD COMMUNICATIONS YEAR

THE YEAR OF THE 3Cs — CASUALTIES, CONFUSION AND CASH.

It would be remiss of me not to start this column with my personal thoughts regarding the true spirit of communications in, World Communication Year 1983.

By this I mean the outstanding effort by the Amateur Fraternity as a whole, when we were confronted by our greatest test in decades —16 February — Ash Wednesday.

Up until this time, a lot of people in authority and particularly the public in general, were not fully aware of the role that amateur radio can play in disasters such as this. It is a sad fact that it takes such a disaster to prove to people that we, with our multi-facit hobby that embraces most modes of communication, many of which are not available to other emergency services, should be one of the first organisations contacted in future disasters.

What, you might ask, has a purely local event got to do with a DX column? It's times like this that we realise just how multi-cultural we have become in Australia. It was amazing some of the countries that were calling "CQ Melbourne, Australia", with the sole purpose of trying to find out how their relatives or amateur friends were going, with news reports on overseas TV and radio that the whole of Victoria and remote towns like Fitzroy and Collingwood the inner suburbs of Melbourne were also on fire. It's no wonder, with the overload on the overseas phone system, due to people trying to find out news of loved ones, that they resorted to a friendly amateur DXer for reliable news and, it is pleasing that the field of the amateur DXer was able to ease the mind of many overseas people regarding their loved ones. It's a sad fact of life, but it takes disasters such as this, to make one realise the true meaning of "World Communication Year", when one person reaches out his hand to another, whether it be across the country or the world.

GULLIBLE

I am amazed at the gullibility of the Amateur Fraternity in regard to DX operations.

We suffer TVI complaints from neighbours when we fire up the linear or, turn our beams, firing over their homes to get that rare one, long vigils that extend hour after hour, night after night. Fairly heavy flack from the XYL when she has made plans to go out that night but you say "Sorry old girl but there's a rare one on tonight and I can't go out," knowing full well that when you finally get to bed, the hot water bottle won't be the only thing that is cold.

Is it worth it? After looking at this years DX situation I don't think so. After trying to get your call sign through a dogpile, to a rare DX station, you finally make it after perhaps up to 200 hours of vigil, trying to find and work him or her, only to find that after sending the "green stamp", card, etc, to a tune of at least $2 per QSO, the reply is "Sorry old man, not in log", or ARRL says no credit for DXCC, or of late, what has become a standard procedure for some expeditions and QSL managers, to send your card back via the bureau, even though you have included a self-addressed envelope, plus a "green stamp", for the return of your card.

But, what do we do? Line up like sheep following the Judas lamb to the slaughter the next time a rare?!! station comes on air.

If you start adding up how large a business this chase for wall-paper has become, is it not about time that we, the poor bunnies on the paying end of the business, got a better deal for our time and effort, not to mention, hard earned money. One way of doing it would be to make it a first priority that any expedition first be approved by the ARRL gentlemen, because a lot of these latter so-called "DX expeditions", knew full well before they went, that it could and would be rejected by ARRL for DXCC purposes.

HEARD ISLAND

Without doubt, the DX expedition of the year, the one most wanted by overseas operators, plus many VKs.

The operation by the VK6 and VK9 orientated DX expeditioners has had tomes written about it, so the pro's and con's of these individual operations won't be laboured. However, there are some points that have not had much media coverage, one of them being the cost per contact for every QSO. It's rumoured that the VK0HI operation from VK6 worked out at a cost of $5 plus per QSO, for a total of 30,000 contacts. If so, with only 14,000 contacts, and a similar expenditure or dearer to get to Heard Island, it is wondered how much it cost per QSO on a purely amateur basis, for the VK9 expedition. In these days of vast expenses to get to such remote spots, it is thought that it will be quite some time before there are any more operations from VK into this remote area. Is it not about time we, as DXers started to get our priorities right and, perhaps give more of our "green stamps" to genuine expeditions, such as the one above, instead of what has become a proliferation of people who are into the DX scene for a quick dollar, or in some cases, many dollars.

One such operation was a ZL1---, when New Zealand first got the ZM call sign. He had the European stations lined up like farmer Brown's cows, waiting to be milked of IRC's and "green stamps". Not once did he mention that it was a special ZL call for WCY, but only "QSL to my home call, ZL1---". I am sure that countless hundreds of Europeans raced off to the post-office with the card and IRC's, thinking they had worked Tokelaus. It was only when a VK station who knew him, asked where he was in ZL that the dogpile disappeared, however, one hour later, he was back on air doing the same thing, with a dogpile. I feel this was deliberate mis-use of a special prefix for WCY, however, he was not the only one to take advantage of specially allocated suffixes and prefixes and most of them were "QSL via my home call in the call book, or my manager", with the inference that return postage was required.

I did hear a few stations with special calls say, "Don't send us a card, we QSL to all contacts for this special call via the bureau", but they were by far in the minority, even though they had the true spirit of what WCY was about.

You may think, by previous remarks, that they are on the negative side. Well, I for one, love the art of DX chasing, and, as such, hate the way that it has become so mercenary and, the main bone of contention last year seems to be, will it be passed for credit by ARRL.

Below is a list of some of the rarer stations you may have worked during 1983.

A6XJC	UNITED ARAB EMIRATES
BY8AA	CHINA
C53OF	THE GAMBIA
D44 BS	CAPE VERDE
FB8WI	CROZET
F6FGW/5V7	TOGO
KL7RA/P	PRIBILOV ISLAND
ON6BC/C9	MOZAMBIQUE
T77B	SAN MARINO
DJ5RT/TT8	CHAD
VK0HI	HEARD ISLAND
VR6KY	PITCAIRN ISLAND
W6LAS/SVA	MT ATHOS
XU1SS	KHYMER REPUBLIC
YI1BGD	IRAQ
ZD7BW	ST HELENA
1S1CK	SPRATLY
1A0KM	KNIGHTS OF MALTA
1Z9B	BURMA?
5R8AL	MALAGASY
5T5AP	MAURITANIA
7Q7LW	MALAWI
BY1PK	CHINA
HK0TU	MALPELO

A good lot of DX for the year you might say, with a lot more on air that are not listed.

Up until writing this article, the following have not been recognised by the ARRL for DXCC credit: S2BTF — 1S1CK — DJ5RT/TT8 — KL7RA/P — ON6BC/C9.

Now let us look at these operations. S2BTF — Why have some cards submitted for this operation been accepted by the ARRL for

DXCC and others rejected? DJ5RT/TT8 — a well-known DXer, not recognised by ARRL because of inadequate paper work. KL7RA/P — one of the many operations during the last few years trying to get new country status.

A case of work them first, then wait for recognition before sending off "green stamps". 1S1CK — now this is a classic example of the double standards of the people who make the decisions for who will or, will not be eligible for DXCC awards.

We had a situation some years ago, when an expedition, launched from Brunei, with VK operators on board, were fired on from the main islands in Spratly, so they operated from an out-lying sandy cay, and were accepted for DXCC. This year we had an expedition by four German operators, two of whom, DJ3NG and DJ4EI, unfortunately lost their lives when fired upon from the same island. So who can blame 1S1CK for operating under the same conditions as the previously recognised expedition? But, so far, "NO" from the ARRL for DXCC credit. Would the German expedition have been OK?, or did two fellow amateurs die in vain?

1Z9A ex XZ9A — I would like to know where the many IRCs and green stamps have gone to from this, as yet, and not likely to be, recognised DX operation. Are we, inadvertantly, financing some separatist group or, worse still, some rebel movement, with our green stamps, in some of these places? If so, it is not good for amateur radio to become involved, just to get confirmation of a country.

C9 — There have been a couple of operations from this spot last year but "NO" again for DXCC.

I know that other keen DX operators have a lot more cards than I that make nice wallpaper, but are of no use for anything else from operations such as these expeditions. You would think we could have at least got it right just once for World Communications Year 1983.

WORLD CONFUSION YEAR

But the previous was only a fore runner for more confusion on the bands. At one stage I thought that WCY stood for "World Confusion Year", with the United States issuing their new call signs eg AC4.

I know a couple of old timers who nearly had a heart attack when they first heard it. They thought TIBET was back on air. 9N38, this I thought, has to be a pirate but, no, turns out to be NEPAL, celebrating thirty eight years of Sovereignty Rule. T77C, now replaces M1C SAN MARINO. The list would be virtually endless, with countries gaining their independance, and some countries like Portugal, having five separate callsigns for the year. With other countries allowing their amateurs to use special prefixes for anything from, their clubs first year of operation, to Aunt Harriet's hen laying its first egg it seemed.

It was gratifying that all VK's were allowed to use at their discretion the AX prefix for International Communications Day and in October to celebrate our historical yachting victory of winning the America Cup. Congratulations to the WIA and the DOC for their quick thinking and prompt action.

One of the new frequency allocations that affected all DX operators most for the year was the move of the Americans 50 kHz down the 20 metre band to 14.150 MHz. It may have eased their over-crowding but, it has made 200 out of 250 kHz unusable for VK amateur SSB operators when they have one of their local or international competions, 5-9+20 dB QRM with the rest of the world trying to fit into the 14.100 to 14.150 MHz segment, you could not have heard a rare DX station even if he was game to come on to 20 metres. With propagation going down on 10 and 15 metres, we can look forward to a lot more congestion on the lower frequencies in the next few years until the next sunspot high.

We did make some good gains during the year, with many low frequency operators making good use of the DX window on 80 metres. Also the gain to the VHF boys on 50 MHz, with a good chance if they keep their operations spot on with no interference they may get the 50 MHz band back permanently in 1985.

The best gain for the year I think, was the elimination for the need to keep a log book, except for emergency purposes, or when directed to do so by DOC. It will be a good thing for the VHF operators but for the HF DXers, a log will still be necessary, not so much for QSO confirmation, but with SWL awards being a big business overseas, it will be a necessary evil to check all those SWL cards that arrive at the QTH each year.

There were some very good community services and publicity orientated exercises by the various clubs and individuals during the year, but the majority of us only paid lip service to WCY, being content to pass out a few AX or WCY callsigns, particularly in comparison to the Liberian effort, with all the proceeds from their special prefix of A8, going to aid the Ganta Leper Colony, located 560 kilometres off the coast of Monrovia. This is one case of our "green stamps" going to the needy and not the greedy.

IN CONCLUSION

Personal thoughts are that we, the amateurs of Australia, could have contributed more to WCY. Taking the Liberian exercise as an example, we could have perhaps adopted one of the poorer developing countries in our area, or some worthwhile International charity, aiding some of the less fortunate people around the world such as, some of the people who are daily starving to death in some countries in Africa. Contributions in technical or financial aid, would have done a lot to enhance the image of the Australian amateurs, both locally and internationally.

After all, WCY was supposed to highlight all the good things that communications can do for all the people of the world, and not be just a new way for some amateurs to exploit fellow amateurs with the catch cry for the year being "Please QSL direct for this special call". No way.

VK3YJ

GRIZZLE

It would be a great resolution for 1984, if all operators on all bands thought of leaving the preferred DX expedition operating frequencies of 28.685, 21.295, 14.195, 7.085 MHz and the DX window on eighty metres a minimum of + 5 kHz clear of across town chatter.

Recently two DXpeditions were swamped by inconsiderate amateurs, who are not interested in rare countries, and who wouldn't shift even when the position was politely explained to them that they had a rare DX country underneath them. Their idle "rag chew" riled many and their remarks were not complimentary to the hobby and should have been conducted per the telephone.

Many stations, it is felt, don't realise that their behaviour on air is tagged to their fellow operators and the country in which they reside. Let us as VKs set an example to the listening world and not be classed and openly talked about like some of the European operators are.

SABLE ISLAND

It has been reported that all future expeditions to this desolate outpost will be able to use the callsign CY9SAB. This will be quite a change and it is a good move in my book as some previous expeditions have had to use some complicated callsigns and not all of the amateurs interested in DX were sure that it was an authentic expedition.

UNUSUAL CALLSIGNS

The year 1983 would have to do gown in the annals of history as being the year that prefix hunters dreamed of. It was in all, a proliferation of the rare and most unusual callsigns ever heard around the bands.

Not to be outdone was the USSR who contributed their share of all takers. Two that conjure up the imagination to be a brand of receiver was RX4 and RK4, these were used by the Udmurt Autonomous Soviet Socialist Republic to celebrate the 425th anniversary of its union with Russia.

Not to be outdone also was the radio club at Chelabinsk, who transformed one of their many calls UK9AAN into RW9A for the CQWW contest and performed very well according to all reports.

Whilst on the discussion of the USSR, it seems that the rule of QSL to Box 88 may be not as strict as it used to be, as various QTHs have been given out by operators of recent times. To play safe for all concerned and until an official ruling is given please QSL USSR contacts via the Bureau.

KERMADEC ISLAND

Warick, home call ZL3AFH has been operating as ZL8AFH, prior to the "change" that is due to take place from the first of this month. It is apparent that the New Zealand Post Office authorities have given him the necessary authority to be an early bird. All QSLs for his operation go to Art ZL2HE who is a well known DXer, official of NZART and a prompt QSLer.

JARVIS ISLAND

George AD1S made it to the over inhabited island, which has an estimated population of over one million (birds that is), a little later than scheduled due to engine trouble but they were there. The DX crew did a magnificent job and their operating was a credit to all concerned. The VKs in the eastern states could never complain of the attention that they were given by this group. On the other hand there were many grizzles from the UK and Europe in the early days of operation because propagation was not very kind to this part of the world.

It is unfortunate that there was an internal hitch in the arrangements that Baldur DJ6SI (of the ill fated Spratly Island expedition) did not accompany this group and intended to go to 9L1 after the firm arrangements fell through.

All QSLs to AD1S for the Jarvis operation.

BURUNDI

"Bull" 9U5JM is operating. He is presently using a dipole and has big plans for all bands including pressing a 40 metre quad antenna into service and phased verticals for eighty. Knowing the tenacity of this gentleman which coupled with his majestic political "know how", he will get there.

PROMPT CARD RETURN

Quick turn around "medallions" would have to go to BY1PK closely followed by HK0TU. The people associated with these callsigns should really take a bow in the prompt and efficient return of much wanted cards. It is indeed a pleasure to be able to report of prompt and reliable QSL routes.

Incidently HK0TU notched up some 21 000 QSOs for the operation, 9000 on CW and 12 000 on SSB. Not a bad effort in anyones language.

NIGER REPUBLIC

Don't overlook any station signing 5U7** or /5U7 as there is a chance that KC7UU will be visiting the area this month. A unconfirmed report from reliable sources indicates that the Hensons may make it to that area also.

SOUTH YEMEN

Pierre J28AZ is not telling all and sundry that a 7O expedition is out of the question. No reasons have been given. Well it was nice hoping!

PITCAIRN ISLAND

Tom VK6TC, has not been heard on the bands over the last few months, as he is holidaying with his XYL Betty in New Zealand where he has been kept busy learning the intricacy of the new commercial radio equipment that will be installed on the island. Tom also had an appointment with the Governor, to receive his MBE which was awarded by the Queen early last year. Tom and Betty were due to return home late last month.

KH9 ACTIVE

Dave KE4UX/KH9 has been active and hopes to keep the pace up with his TS830 and TH6 until he returns home next September.

QSLs may be sent to Dave via PO Box 248, Wake Island 96898, USA.

DXCC SURVEY

The DX-NEWS hold an annual survey of the most wanted countries. Of the many hundreds of subscribers to the excellent publication only 70 responded. Perhaps these could be called the "dedicated".

The first of the eleven most wanted countries turned out to be a tie between CE0 San Felix and XZ (55 wanted these), the Laccadives VU7 (52), were next in line, followed by 3Y4 (48), ZA (47), 7O (42), HK0 Malpelo (35), XV & VU Andaman (33), BY (31) and FO8 Clipperton (29) in that order.

The survey was taken prior to the recent HK0 operation so it is imagined that the need for this country may have waned a little.

Many VK's will see that they are not the only ones wanting the difficult ones. They will become active in the future but when is the big question that everyone asks. No one can do very much but be patient. Your patience may be rewarded earlier than you think!

SENEGAL

All those 6V prefixes emanated from Senegal. All 6W prefixes had the opportunity of using this special prefix for WCY. QSLs should go to the 6W suffix in each case.

MACQUARIE ISLAND

Nice to hear and work the new group that have reached the island and to know that David VK0CK (home call VK5CK) has got the six metre beacon percolating. Good six metre and HF DXing David. All QSLs to VK2BGZ.

QSL ROUTES

As stated previously in this column, all QSL routes are given in good faith after cross checking with various reliable sources, but no guarantee can be given to anyone, that they will receive a card either by return mail or via the bureau. Unfortunately this is a guarantee no one can give.

Also the writer cannot and will not accept the responsibility of acting as a QSL bureau either in the receipt or despatch of cards, however all requests for help will be answered when time permits, if accompanied by a SASE.

WILLIS ISLAND

The new operator assigned to Willis Island for the first half of this year is Graeme VK5GW. Graeme will have the duties of Officer in Charge at the base for the period.

One of Graeme's interests is Oscar 10, and he has chosen the following equipment for his tour of duty. A Kenwood TS770 plus linear amplifier, Icom 260A with two metre crossed yagis, and two 19 element antennas for 70 cm operation.

Another of Graeme's interests is six metres. An EPROM has been made up with his allotted call of VK9ZW and the beacon will be running at all times. He will be pressing his own linear amplifier into service and the loan unit will be returned to Gil VK3AUI.

RTTY enthusiasts may be in for a new country, as Graeme is taking his Icom 720A along, complete with the latest "singing" and "dancing" Telereader that is available.

QSL arrangements will be in the ever capable hands of Jill VK6YL.

HEARD ISLAND

As indicated in my article on p 22 AR, June, 1982, with reference to income and expenditure for the Heard Island expedition, which was undertaken by the DX CHASERS CLUB, that a financial report would be published on the completion of the expedition. This report is now to hand and is printed in a consolidated form due to its complexity.

CONSOLIDATED FINANCIAL REPORT OF THE HEARD ISLAND 1983 DXPEDITION (VK6 DX Chasers Club)

EXPENDITURE

Charter of Anaconda II	$30,000.00	
Radio Equipment & Parts	$4,787.98	
Travelling Expenses	$981.50	
Phone/Postage/Stationery	$1,798.39	
QSL Card Printing	$750.00	
Bank Charges	$46.40	$38,364.27
INCOME		
Donations	$33,165.25	
QSL Receipts	$737.20	
Sale of Equipment	$2,458.87	
Bank Interest	$36.89	
Recoup of Air Fare (Adelaide/Perth)	$248.50	
Deficit (Underwritten by DX Chasers)	$1,717.56	$38,364.27

C A Bastin, VK6NLZ
HONORARY TREASURER
WIRELESS INSTITUTE OF AUSTRALIA, VK6 DIVISION

I have examined the Accounts, Vouchers and other relevant documents produced to me by the Honorary Treasurer of the WIA, WA Division.

These appear to be the records kept by the Honorary Treasurer, to account for the moneys held in trust by the WIA, for the Heard Island Expedition 1983 (VK6DX Chasers Club).

The Consolidated Financial Report prepared by the Honorary Treasurer accurately summarises the amounts received and paid by the WIA on behalf of the Heard Island Expedition 1983 (VK6DX Chasers Club).

J Taylor, AAII AAIM, VK6JK
HONORARY AUDITOR WIA (WA DIV)
28th October, 1983

QTHs YOU MAY NEED

9Y4WCY — PO Box 1167, Port of Spain
C21RK - PO Box 139, Republic of Nauru.
CT9MIC — PO Box 186, Madeira
H44SA — PO Box 350, Honiara.
HC1OT — PO Box 547, Quito
HK3NBB PO Box 3831, Bogata.
KP2AD — PO Box 2611, St Thomas, USVI 00801.
YV3NBB — PO Box 510, Valencia.

SOME USEFUL QSL MANAGERS

4U1VIC — OE Bureau, 5W1EJ-W0WP, 9H1EL-LA2TO, 9Y4RD/SU-KA2DDJ, 9Y4W-N2MM, AD1S/KH5-AD1S, KH0AC-K7ZA, KH6GB/KH3-KH6GB, NP4DR/V2A-WB8SSR, OK0WCY-OK1KSO, P47N-W5AT, PJ2FR-N6KT, RF6V — UK5IBB (Bureau only), T32AF-KH6UR, TI2C-W6TTH, VP2VDH-N6CW, ZM0AJN-N7RK

THANKS

Thanks are extended to such magazines as OZ, World Radio, Radcom, QST, cqDX, Veron and weekly newsletters including DX-NEWS, QRZ-DX, LONG SKIP, DX-NL which provided interesting reading. Australian amateurs who have contributed include VK2PS, BGZ, EBX, 3BY, FR, UX, YJ, YL, 6NE and L30042. Overseas amateurs include DJ9ZB, DL8FL, JH1KRC, ON7WW, I8SAT, ZL1AMM and AD1S. Sincere thanks to one and all and good DXing.

NOTICE

ALL copy for inclusion in March 1984 Amateur Radio must arrive at Box 300, Caulfield South, 3162 no later than 25th January.

AMATEURS: GRAB A BARGAIN!

Cat D-2940

All New, All Mode, All Powerful Computer Aided Transceiver

FT-757 GX

Wow! What a transceiver. Everything you could EVER want...and then some! Even before its release, Yaesu have over 5000 on back order: that's just from the brochure!

It's the absolute latest state-of-the-art in design—in fact, its CAD/CAM (computer aided design, computer aided manufacture) ensures unbelievable standards of reliability.

- **All mode—including FM with no optional extras**
- **All HF bands from 160 to 10m including WARC**
- **General Coverage Receive—500 to 29.999 MHz**
- **Computer Aided—use with your micro for external control**
- **Full 100W PEP/DC at 100% duty cycle**

NOT $1399 NOT EVEN $1199 *BUT AN INCREDIBLE* **$999**

HUGE SCOOP PURCHASE!

Over half a million dollars worth of AMATEUR GEAR!

...and now we're grossly overstocked. Our warehouse is just bursting at the seams. We must clear the excess immediately!

You reap the benefit: look at the bargains on this page and you'll agree! But hurry — at our low, low prices even our excess stock is not going to last too long. And you'd kick yourself if you missed out!

FC-757AT Automatic Antenna Coupler!

Incredible! The sort of coupler you dream about. Uses an inbuilt 8-bit micro to automatically find the right band and then match for minimum SWR. Includes in-line wattmeter, SWR meter, dummy load with 100W rating! Cat D-2942.

ONLY $399

RS-232C Interface

WOW! Run your transceiver via your micro computer! This quality interface allows external control of VFO, memory functions etc. 4800 Baud — it's so fast!
Cat D-2943

$99

Sounds too good to be true? Come & see

FT-757 GX

SWITCH MODE SUPPLY

Just about as neat as they come! Fits under your FT-757 and you'd hardly notice it's there. Designed just for the FT-757, this superb unit makes your base station really look the part! 240V input.
Cat D-2941

INCREDIBLE! ONLY **$299**

DICK SMITH Electronics

NEW 70cm H/held

FT-708R

Superb hand-held transceiver for people on the go! Covers full 438-439 MHz band (25kHz steps) with simplex AND standard 5MHz repeater split. Cat D-2930

- **NiCad battery and rubber duckie whip areincluded!**
- **Low 720g weight**
- **Switchable 200mW/1W output.**
- **10 memories**

AND IT'S ONLY **$399**

CAN YOU MEET THE CHALLENGE?

OF A 'HOME BREW' UHF TRANSCEIVER

The 'good old days' of amateur radio (when you proudly built your own gear) are here again! And with the all-new Dick Smith UHF Explorer, you'll end up with a transceiver of lower cost—and higher quality—than a commercial unit! YES! A complete up-to-the-minute design with locked-loop frequency synthesis!

Freq. Cov.	438.025 - 439.000MHz in 25kHz steps.
No. of Channels	40
Mode of Operation	FM
Supply	13.8v DC. Receiver 340mA with full audio output and all options. Transmitter 2A more (5 watt output).
Receiver	
Sensitivity	Dual Conversion Superhet 0.4uV for 20dB quieting
Selectivity	+/−7.5kHz – 6dB +/−15kHz – 60dB
Adj Chan Reject	Better than 80dB
Transmitter	
Power Output	5W (typical)
Deviation	+/−5kHz

Cat K-6300

$199

EXCLUSIVE TO DICK SMITH!

OPTIONAL UPGRADE KIT

A superb backup package: Repeater, S meter, additional xtal filter & new front panel! Cat K-6302.

ONLY $24.50!

ANTENNA KITS

UHF antenna kit has gutter gripper, UHF whip & cutting chart, base & UHF co-ax. Cat D-4014. **$24.50**

Deluxe Magna Base: For 'centre-roof' position, without drilling holes! A super idea. Cat D-4514. **$29.50**

FANTASTIC VALUE ...6M ALL MODE

(SHOWN WITH D-2545 LINEAR UNDERNEATH.)

The FT-690

Channel 0 has been given the shove—so all amateurs will soon be able to use 6m properly. Here's your chance to grab an all-mode portable/base/mobile rig—at a fraction of the normal price: The Yaesu FT-690! 12V, internal batteries or external supply. Around 5W out. Cat D-2886.

Normally $425 or so! $199 ...our price

70cm Linear Amp

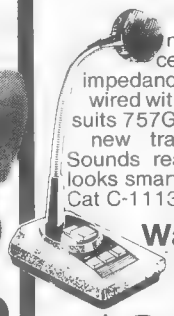
Get real oomph from your FT-780 or sim. handheld! This FL-7010 gives you around 10W at 70cm. Cat D-2544. **$79**

6 metre Linear Amp

Boost your FT-690 to around 10W! It's ideal for mobile — 12V operating. **$79** FL-6010 Cat D-2545.

SAVE $25

Yaesu YM-38 dual Z desk-type scanning mike



Goes with most transceivers–dual impedance. Comes wired with pin plug, suits 757GX & most new transceivers. Sounds really great, looks smart, too. Cat C-1113.

Was $55 NOW ONLY **$29.50**

MMB-1 Universal MOUNTING BRACKET

For mobile mounting of most HF transceivers—suits FT ONE, 980, 107, 757, etc. Saves the rig slopping about all over the car! Cat D-2944

$19.50

NEW! THRIFTY NOVICE HF TRANSCEIVER!

NEW

FT-77S

Low power version of the famous FT-77 transceiver. One of the most popular Yaesu models around. Now novices can get onto HF at a low, low price—without sacrificing any of the features of the big rigs (except power—& you're not allowed that!!!). Later on, when you get that big ticket, just add a linear and you're up with the big boys! Cat D-2914.

amazing value! **$599**

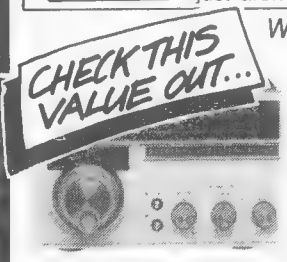
NEW

THRIFTY EXTENSION SPEAKER!

SP-55 Yaesu Speaker

Suits most transceivers—ideal for dog-piles or high QRN when those little speakers inside most sets just aren't good enough! **$29.95** Cat D-2913.

CHECK THIS VALUE OUT...



$200? $150? No...now a crazy **Dummy load**

20W load & absolutely flat response from DC to light (well, almost: it's flat to over 500MHz!). A must for the VHF/UHF amateur. Cat D-7025

$69 Was ~~$99~~!

VALUE!

$19.95

WOW! INCREDIBLE YAESU VFO BARGAIN:

FV-107

5.5-5.0 MHz

Superb! Will suit most transceivers and has tons of room inside box for other projects (eg: a transceiver!) Cat D-2870

Head Office & Mail Order Centre: PO Box 321, North Ryde, NSW 2113. Ph: (02) 888 3200.
PLUS 39 STORES ACROSS AUSTRALIA!

DSE/A687/TH

INFORMATION TECHNOLOGY WEEK

Alan, VK1KAL
PRESIDENT WIA ACT DIVISION

Information Technology Week (ITW) 1983 was held throughout Australia during July, August and September, with activities designed to focus the attention of the general public on the present and future uses of information technology.

One of the highlights of this year's programme was the establishment of Information Technology houses in Queensland, Victoria and the ACT. These houses were, externally, typical suburban homes, if a little up-market, organised with the aim of demonstrating the application of the latest range of information technology linked with work, education, leisure, home management, energy control and communications.

In the ACT, the programme was sponsored by the Department of Science and Technology and the Australian Computer Society. The activities took place during the month of August and, in addition to the display home made available by Jennings Industries, a number of seminars and exhibitions were held throughout the ACT.

Our involvement with Information Technology week began with a request from the Radio Frequency Management Division of the Department of Communications to the Division to establish and operate an amateur radio station using state of the art equipment. As it was to be nearly a one month operation, it was agreed that the various manufacturers and retailers should be requested to loan such equipment. In the event, the only company that responded to the request was Kenwood (Australia) Pty Ltd who, without hesitation, supplied the following equipment:

Kenwood TS930 HF Transceiver
Kenwood TS9130 VHF All-mode Transceiver
Kenwood R2000 Communications Receiver
Kenwood PS930 Power Supply

Thanks to Mr Sandy Brucesmith for his invaluable assistance in loaning the equipment and help in setting up the station.

It is worth noting that none of the equipment was returned to Kenwood as the "hands-on" operating experience so impressed some of the station operators that all of it was purchased by the end of the display.

As it was not possible to erect a tower, it was decided that the HF antenna should consist of a five band trap dipole. This was strung between a couple of convenient trees. The tuning of this antenna was carried out by a well qualified crew consisting of a couple of COCPs, a handful of AOCPs, a BOCP and an NAOCP, but, despite this, they managed to get the antenna tuned. The VHF antenna was a Slim Jim constructed on a broomstick, a state of the art broomstick of course, by Richard VK1UE.

DOC supplied our permit to operate the station along with a special callsign, VK1IT, and we were ready to go. However, prior to the opening, the local District Radio Inspector came along to check it all out as there was some concern that our transmissions might interfere with all the other electronic equipment in the house. This equipment, incidentally, included various microcomputers, satellite television, video disc players, facsimile and teleprinter equipment, and a central computer controller which managed the house's heating, lighting, garden sprinklers etc. In addition, there was an electronic burglar alarm system installed by a security firm who had expressed an interest as to the possible triggering of their alarm by amateur transmissions, in the event the system was never installed so we caused no problems with it.

VK1IT radio shack housed in a bedroom cupboard.

As it turned out, the amateur equipment did not effect any of the equipment in the house, despite exhaustive tests on all bands. It was interesting to note, however, that the amateur equipment suffered from severe interference from the computer equipment. This was especially noticed on 80 and 40 metres, probably due to the computers using a crystal clock frequency of around 3.5 MHz. Luckily interference from such equipment will be covered by the new Radio Communications Bill. It was also fortunate that the computer operations were primarily confined to the weekdays, whereas amateur operations were primarily at weekends, so computer generated RFI did not prove to be a major impediment.

The first official transmission from the station was made by the Minister for Science and Technology following the official opening ceremony at the house for Information Technology Week. Unfortunately propagation conditions were abysmal with hardly a chirp being heard on any band. However, it was arranged for one of the local amateurs to be on air in case such a situation should arise (having learned the lesson from earlier experiences) and the Minister was able to have a chat with him for some time.

The Minister for Science and Technology, Barry Jones, making the first official contact from VK1IT.

During the remainder of the month, a considerable interest was shown in the station by the public, for many of whom it was their first contact with any form of amateur radio and, whilst it may not have accomplished much by way of generating new members, it succeeded in educating the general public to the existence of the hobby and to the "mysteries" of amateur radio. We feel that it was also useful in demonstrating to the public and to industry that amateur radio is not the interference threat that many thought it to be. A considerable number of contacts were made during the period, and some 12 countries worked. We also understand that the ACT Technology House was the only one that provided an amateur radio display.

This was actually the third time this year that the Division had participated in public displays of amateur radio, the other two being the AX1ITU display set up at one of the local shopping malls during World Telecommunications Day and the VK1WI display set up in Weston Park during the John Moyle Memorial Field Day Contest.

Information Technology House. Note the Toshiba Satellite Receiving dish in the foreground.

In addition to the Technology House activities, a number of exhibitions and Seminars, as mentioned above, were held in the ACT. Among the more interesting, from the amateur point of view, was the major computer exhibition at one of the local hotels. This was organised by the Microprocessor Special Interest Group (MICSIG), and included presentations on the latest personal computer advances. Of interest also was the Telecom AUSTPAC seminar which discussed the latest applications of "packet switching" in telecommunications. Most amateurs will have read of this type of technology in relation to the advances being made by amateurs in "packet radio".

All in all, the Information Technology Week exposé was a resounding success, and helped the public to understand some of the advances being made in our "sunrise" industries. The opportunity given to educate the public about amateur radio was useful, and served as a valuable public relations exercise.

Finally, we would like to extend our thanks to the following people for their assistance and co-operation:

Mr Sandy Brucesmith of Kenwood (Australia), Mr Gilbert Hughes VK1GH, of DOC, Mr Alan Jordan VK1AJ, the District Radio Inspector, and VK1s GB George, RH Ron, MM Fred, UE Richard, NEB Gavan, IC Ian, KCD Richard, CJ John, NEU Kurt, DA Andrew, RG Richard, DH Don, NET Chris, OK Kevin, NH Nick, and ZBC Murray. Apologies to anyone missed.

AR

QSP

AMATEURS TRAVELLING TO JAPAN!

If assistance on amateur radio matters is required whilst in Tokyo, members are advised that the Tokyo International Amateur Radio Club meets on the last Friday of each month at 8 pm at the Okura Hotel Executive Lounge.

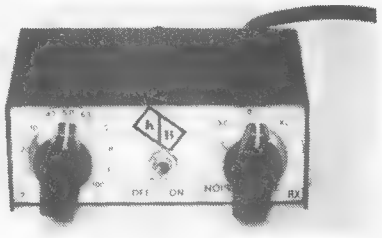
The secretary of TIARA can be contacted via Box 119, Akasaka, Minato Ku, Tokyo 107.

Keith Wilkinson ZL2BJR is also available to assist via GPO Box 1748, Tokyo 100-91.

from Keith Wilkinson ZL2BJR

AR

WIN A KB NOISE BRIDGE



K Brucesmith of 110 Rosemead Road, Hornsby, NSW has kindly donated a KB R-X Noise Bridge. As reviewed in November AR page 15.

Adjust your antenna for maximum performance with this Noise Bridge. This bridge is better than an SWR meter and operates over 100 MHz. This would make a nice addition to any shack.

COMPETITION QUESTION

A 1 mfd capacitor is charged to 100 volts and a 2 mfd capacitor is charged to 200 volts. They are then connected in parallel, positive plate to positive plate and negative plate to negative plate.

What is the voltage across the combination?

RULES

The contest is open to all members of the WIA, with the exception of all people and their immediate families associated with the production of Amateur Radio. One entry per member, each entry to be hand-written on the back of a standard Australia Post approved small envelope.

Entries must be received no later than the last mail, Friday, 24th February, 1984 and the winning entry will be the first correct answer drawn by the Editor of AR, on the 6th March.

The Editor's decision will be final and no correspondence will be entered into regarding the decision. Results will be published in April AR.

All entries to: AR Competition Box 300, Caulfield South, 3162. On the back of the envelope your name, address, callsign and the answer to the problem.

Only entries in the above format will be accepted. All others will be disqualified.

RAAF SIGNALS & RADAR MEMORIAL PLAQUE

The dedication ceremony of the Memorial Plaque at Adelaide Airport on 30th October, see page 59, October AR, was a great success.

Approximately 160 people were present with a good proportion of the Radio Amateur Fraternity. Bill, VK5AWM, in the official role of President of WIA, South Australian Division represented many amateurs who could not attend.

John Allan, VK5UL
PRESIDENT — RAAF SIGNALS AND RADAR ASSOCIATION OF SOUTH AUSTRALIA

AR

Front Row Standing:— Centre — Air Vice Marshall M J Ridgway — Guest of honour, to his left — Group Captain Holland — Representing the RAAF Base — Edinburgh, to his right — John VK5UL — President RAAF Signals and Radar Assoc SA.

Among the many amateurs present were — Ray VK5RK, Cec VK5CD, Jack VK5HT, Keith VK5KH, Harvey VK5HQ, Bill VK5HR, Allan VK5ZX, Phil VK5NN, Frank VK5BU, Clarrie VK5KL.

ALARA

Australian Ladies Amateur Radio Association

Margaret Loft, VK3DML
28 Lawrence Street, Castlemaine, Vic 3450

Susi DJ2YL and her Australian silky terrior Silka.

L to R: Poppy VK6YF, Bobby VE7CBK and Jill VK6YL,

Mavis VK3KS and Marilyn VK3DMS.

Valerie VK4VKT

Anne VK4NXK.

L to R: Pearl ZL2QY, Poppy VK6YF, Celia, ZL1ALK and Elva ZL1BIZ.

L to R: Biny ZL2AZY, Elizabeth VE7BIP and Poppy VK6YF.

Margaret VK2 DQG and Cepha

Ruthanna WB3CQN and Misti.

Bonnie VK3PBL

Welcome to 1984 and do hope it is going to be a very good year for us all in our chosen hobby, with WCY behind us let us all keep up with the good public relations that have been achieved.

ALARA was delighted with the article in New Idea magazine and the response we have received from it, thirty letters to date from all states of Australia. In just over two weeks it was a very worthwhile result and we hope to hear some of them join the amateur ranks in the near future.

NEW MEMBERS

Please add these to your list in November AR.

Welcome to

JJ1LQI	Hisako	ZL2VQ	Carol
ZL2QW	Pauline	ZL1FV	Gail
WB3EFQ	Lois	VK3CYL	Kim

Alice XYL of VK3PEC

ALARA'S CONTEST NO 3

Yesterday was very successful again and a very grateful thank you to everyone who joined in, especially to the OMs.

We do like to hear the OMs calling in and only wish more of you would join us, it is for everyone NOT just for YLs, and it is a golden opportunity to obtain the contacts needed for the ALARA award. So please join us next year on the 10th November.

Over the last few months I have been compiling a group of photos of ALARA members, thanks to those who have loaned me some of their own. I am including a number for this month's article.

Subscriptions are now due and Valda VK3DVT our treasurer will be delighted to hear from old and new members; membership is $5 yearly. For new members a copy of our new information sheet will be sent to you on enquiry to PO Box 4, Middle Brighton, Vic 3186.

ALARA Net: for daylight saving the time is at 1000 UTC on 3.580 ± QRM.

Until next month 33/73/88 to all Margaret VK3DML

AR

Microwave Developments

UHF & MICROWAVE COMPONENTS

Our improved 70 cm and 23 cm Power/VSWR Meters are priced under $100. Each has high and low accurately calibrated, switched ranges and a direct reading VSWR scale on low.

1269, 1296 and 1700 MHz Long Loop Yagis. 1, 2 and 4 Bay with splitters. Soldered copper from $65 (single).

Waveguide, Flanges, Gunn and Detector diodes. All new high quality equipment. Well priced.

3 cm WG Assembly, with 3 dB coupler, 22 dB horn, Gunn oscillator and IN23WE mixer — $125 complete.

Used, working, Gunn diodes for experimenting and getting the feel of it @ $1 per mW, tested in our mount prior to delivery.

PTFE PC Board. ER 2.5, double sided, 1 oz Cu/.0625" @ 14 c/sq cm.

P/P extra at cost. All prices included 20% Sales Tax.

DES CLIFT VK5ZO

6 Netley Road, Mount Barker, South Australia 5251. (PO Box 274). Telephone: (08) 391 1092.

QSP

IARU MEETING

The Administrative Council of the International Amateur Radio Union met in Newington on 3rd-5th November. The group consisted of IARU President Baldwin, W1RU, Vice-President Carl L Smith, WOBWJ, and two representatives from each of the three IARU regional organisations. The mission was to complete the work of constitutional drafting which began in Tokyo last March.

from ARRL Letter, Vol 2, No 22

AR

WHAT IS QRP?

The code QRP is used by radio amateurs to refer to low power operation. The term has been adapted from the Q-code meaning "Shall I reduce power?". Internationally QRP is defined as low power radio communication, using five watts or less input.

Many QRP stations operating QRP operate CW, because in a situation where every aspect has to be optimised to be successful, CW is the most effective mode of communications in the crowded HF bands. Telephony has its place in QRP with many stations operating on SSB only.

CONSTRUCTION

QRP offers the radio amateur many construction opportunities. Equipment is usually much less complex, bringing home construction within the reach of almost anyone.

WORLD QRP FEDERATION

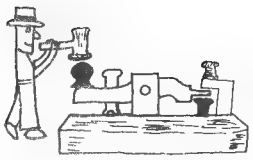
A recent development in QRP has been the formation of the World QRP Federation, an organisation, which already has eleven country-members.

QRP CALLING FREQUENCIES

Band	*CW MHz*	*SSB MHz*
80	*3.560*	*3.690*
40	*7.030*	*7.090*
20	*14.060*	*14.285*

From ZS6TJ Calling, Johannesburg in Collector-Emitter, Sept 1983

AR



POUNDING BRASS

Marshall Emm, VK5FN
GPO Box 389, Adelaide, SA 5001

This month's column was meant to be devoted to QRP operation, but recent developments have necessitated a change of plan. Since QRP operation was the province of the VK CW QRPp Club, it was only natural that I made mention of their efforts, and invited any interested readers to contact the Club, in care of its president, Jack Swiney VK6JS.

Alas and alack, the VK CW QRPp Club is defunct at this writing. In a letter dated 20th October, 1983, Jack regretfully wound up the Club and distributed its assets to the financial members.

The major reason for the failure of the Club was simply that too much was expected of too few officers. Jack, along with two of his VK6 friends, had got the Club going and despite a total of around seventy members, he was struck with the job of running the Club and producing its quarterly newsletter. In the early days, he says, *"there was, undoubtedly, going to be a lot of hard work ahead but I envisaged that work-load sharing would spread as membership numbers in the Club increased. To some extent this did occur later and I am honestly appreciative to those members who volunteered and accepted various office bearer responsibilities."* Unfortunately, it didn't occur to the extent that Jack might have hoped — according to the November, 1982 issue of the "News Bulletin", Jack was occupying four of the club's seven offices.

It's the usual story, isn't it. In every amateur endeavour, not just amateur radio, there are a few who are willing to work for the common good, while everyone else goes along for the ride. After a while the initial enthusiasm of the organisers begins to wear off, and what was at first a joy becomes drudgery. The same applies to employment too — if we didn't have to work for a living we wouldn't stay in the same job very long. Evidently this is a basic principle of human nature. We only work willingly at something that is rewarding and/or maintains our interest.

To be successful any organisation cannot rely for long on the interest and efforts of a few of its members. In the case of the QRPp Club, Jack found that pressures of work made it impossible to sustain his dedication to the Club and his functions therein, *"specifically the production of the Bulletin but also (his) other responsibilities"*. And there was no one else with sufficient interest, or dedication, or available resources (or a combination of the three) to take over the burden.

If a Club is to be successful, the interest and availability of new leadership must be rising as the interest and availability of the previous cadre wanes.

In the case of the VK CW QRPp Club, all is not yet lost. Some of the members are working to either re-establish the Club or create a new one, along the lines of the old one.

The new CW QRP Club is being organised by Len O'Donnell VK5ZF and Col Stevenson VK2VVA, both active members of the old Club.

At the moment, it appears that the new group will be organised as individual State clubs, reporting to a federal association. It has been suggested that management of the Club, and responsibility for production of the Bulletin, should rotate from State to State on an annual basis.

The basic purpose of the Club will remain unchanged, that is, *"to encourage the challenge of using the CW mode under low-power conditions and thereby promote the design and construction of home-brew equipment, antenna experimentation and the study of radio propagation"*.

QRP operation is a stimulating and rewarding side-line for many amateurs — after all, we have an obligation to use the minimum power necessary to maintain a Q5 contact.

Anyone interested in this aspect of the hobby is urged to contact either: Len O'Donnell VK5ZF, 33 Lucas Street, Richmond, SA 5033 or Col Stevenson VK2VVA, PO Box 109, Mt Druitt, NSW 2770.

Any suggestions regarding operation or activities of the Club will be most welcome, as will any offers of assistance.

With any luck, a healthy Club will result for the mutual benefit and enjoyment of its members, with no-one asked to shoulder an unfair burden.

BCNU **AR**

INTRUDER WATCH

Bill Martin, VK2EBM
FEDERAL INTRUDER WATCH
CO-ORDINATOR
33 Somerville Road, Hornsby Heights, NSW 2077

Well, here we are in 1984. A new year, a leap year, and, as we attempt to recover from the disabling effects of the economic trauma which goes with the Christmas season, we can only hope that all readers thoroughly enjoyed the festive season, and we all look forward to, hopefully, a good year to come.

1984, in fact, January, 1984, sees the commencement of the first session of the World Administrative Radio Conference (WARC) for broadcasters. Intruder Watchers of the world are watching the outcome of this conference with great interest.

The first session of the Conference will be held in Geneva for five weeks beginning in January, 1984, and the second session also in Geneva in October/November, 1986.

Part of the Agenda for the Conference is the resolution that *"the planning be based on DSB emissions and that consideration shall also be given to the manner in which an SSB system could be introduced progressively without impairing the DSB emissions, taking into account the economic and other aspects associated with the introduction of an SSB system"*.

So the broadcasters are going sideband. Of course, this will not happen overnight. But it certainly will make many changes on the broadcasting bands, as well as the amateur bands.

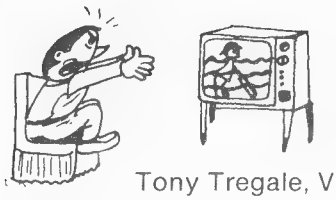
The USSR Naval intruder, 'UMS' has moved back from 14.171 MHz to his summertime (Aust) spot of 21.032 MHz. Perhaps, one of these days, it might occur to him to move away from the amateur bands altogether. 'F9T' is still sending his (Diplomatic?) messages in CW on 21.115 MHz, and is oblivious to amateur operators, or apparently so. Some preliminary investigation of the intruder 'SGJ', using CW on 7.060 MHz seems to suggest that he may originate in Paraguay. Still checking on that one. Jamming is a continuing problem as far as amateurs are concerned and jamming is very evident at times on the 40-metre band. The jamming stations, in fact cause more problems than the stations that they are attempting to jam.

As we are commencing a new year, it seems timely to mention again the availability of the intruder identification tape. This tape contains just about all the modes of emissions you are likely to hear on the air, including AMTOR, RTTY, SSTV, and various examples of jamming signals. It is an interesting and informative tape to have in the shack. If you want a copy, send a blank C60 cassette tape to the address at the top of the column, and I will copy the signals on for you. If you are a newcomer to the hobby, this tape will put you in the picture straight away as to the sorting-out of the various strange noises to be heard on the air.

Reports on intruder stations are sought from listening amateurs and Short Wave Listeners, and can be sent to the WIA Divisional Intruder Watch Co-ordinator, address in the current call-book, or direct to the address above. Help the Intruder Watch world-wide.

AR

NATIONAL EMC ADVISORY SERVICE



Tony Tregale, VK3QQ
FEDERAL EMC CO-ORDINATOR

This month we have permission to reprint an article which appeared in April, 1983 Electronics Australia magazine.

One bomb could black out a nation

Electromagnetic pulse threat from nuclear blast

Nuclear devices exploded above the atmosphere may not hurt people or damage property on the ground in the conventional sense. But such explosions can produce an effect similar to a giant lightning strike and wipe out communications and power supply systems over huge areas, effectively crippling a nation's military forces.

by BRIAN DANCE

The two nuclear bombs used as weapons of war, and most of the nuclear test explosions, have been carried out in the atmosphere, at about ground level or underground. The biological effects on humans and animals, as well as the effect on military and civilian property, have been well studied as regards the damage caused by radiation, the heat flash, and subsequent fires. The air pressure waves have been investigated, and much is also known about the hazard of radioactive fallout in various weather conditions.

Much less is known about the effects of a nuclear explosion outside the atmosphere at a height where hazards to living things and buildings are quite small. It can be shown that such an exo-atmospheric explosion can produce short duration, but very intense, electric and magnetic fields which can destroy almost all semiconductor devices, which are not completely screened, over an area as large as a whole continent. This electromagnetic pulse (EMP) could render all radio transmitters and receivers useless and would also cause the telephone system to fail, since modern systems are largely dependent on electronic switching. Modern vehicle electronic ignition systems would be put out of action, as would many vital military computers.

At the same time, the power line systems would be tripped into the off state (possibly with permanent damage to the insulation) in much the same way as the lightning of electrical storms causes power lines to be tripped. However, EMP tripping would act over a far greater area.

(The effect would appear to be akin to that commonly experienced in the immediate vicinity of a lightning strike, where the electromagnetic field can induce destructive voltages in devices connected to antennas, telephone wires, and power lines, except that this is on a vast scale. Ed.)

EMP does not present a direct hazard to human life but it does pose a serious hazard to electrical and electronic equipment.

Thus, it can destroy the effectiveness of unprotected military equipment over a huge area, and hence the capacity of a nation to respond to a nuclear attack.

The formation of the electromagnetic pulse is due to several mechanisms, but by far the greatest contribution is an extremely intense burst of gamma radiation at the instant of the explosion. Fission bombs, in which heavy elements such as uranium or plutonium split into lighter atoms, and fusion bombs (thermonuclear or hydrogen bombs) in which light atoms fuse together to produce heavier atoms, both produce EMP effects.

If the explosion occurs high in the atmosphere (Fig 1), most of the high energy gamma rays will travel some distance through the rarefied air and will knock electrons out of molecules of the air in their flight (the Compton effect). The heavy positive ions move relatively slowly, but the light energetic electrons formed in this way form an electric charge which rapidly moves a distance of some hundreds of kilometres. This separation of electric charges in the upper atmosphere creates enormous voltages which give rise to the intense EMP effect at the surface of the earth.

All nuclear explosions generate at least a localised EMP effect. If the explosion occurs in the middle of the atmosphere, the resulting fields are relatively symmetrical and they therefore almost cancel at considerable distance from the explosion. However, where the explosion is above the atmosphere, the variation of atmospheric density with altitude provides the asymmetry required for maximum EMP effect.

Maximum EMP effect is believed to occur when the explosion is at an altitude of between 40 and 500 km, but the size of the effect depends on the energy yield of the weapon. Most of the EMP currents occur at an altitude of about 30 km.

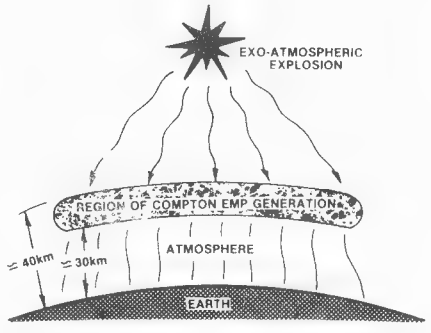


Fig. 1

A nuclear explosion above the atmosphere would create intense EMP effects on the Earth's surface.

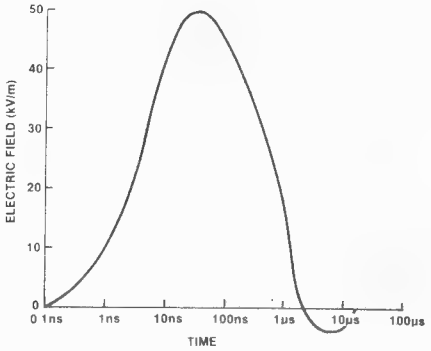


Fig. 2

A one megatonne explosion would generate fields of up to 50kV/metre, with a rise time of 10ns

(50 KV/M PEAK INTENSITY)

A large hydrogen bomb with a yield of one megatonne may produce a peak intensity field of some 50 kV/m at the Earth's surface. As shown in Fig 2, the peak pulse intensity is reached in about 10 ns and its total duration is of the order of 1 us. This is quite long enough to irreparably damage semiconductor devices.

Power lines and telephone lines are very effective at picking up the extreme voltage gradients produced by EMP. It has been calculated that a large explosion could produce a short pulse of some ten million volts on power and telephone lines across the whole of a continent such as Australia, the USA, or Europe, while currents of the order of 10 000 A may momentarily flow in power lines; possibly more than a hundred times the design capacity.

Pulses from power and telephone lines are readily picked up by other equipment in their vicinity which can thus be destroyed. In addition, the higher frequency components of the pulses can be picked up by quite short wires and can damage electronic equipment to which these wires are connected, no matter whether the equipment is operating or not. Radio aerials are obvious sources of EMP pick-up, but far smaller wires will be able to pick-up enough voltage to produce semiconductor damage.

COMPONENT SENSITIVITY

Semiconductor devices are inherently far more sensitive to EMP than the thermionic valves used in the past. Indeed, the fact that thermionic valves can be a million times more resistant is one of the reasons why the implications of EMP were not fully appreciated at an earlier date.

It is most interesting to note that when a Soviet defector flew a Russian MIG-25 fighter aircraft to Japan in 1976, this very advanced aircraft had a body shell arranged as a Faraday shield, with its on-board communications equipment employing sub-miniature thermionic valves rather than semiconductor devices.

The sensitivity of semiconductor devices varies widely, power transistors needing around ten times the energy to damage them than small signal transistors. Integrated circuits may be a thousand times more sensitive than small signal transistors.

The most resistant components are large iron-cored transformers, electric motors and other large components. However, the effects on specified items are difficult to predict owing to the many ways in which the equipment can be arranged and the large number of methods by which damage can occur. The position is complicated by the lack of information on the precise EMP characteristics formed by weapons of a given type. (Nuclear powers are naturally unwilling to publish details of their weapons.)

EMP HARDENING

It is vital to national security that military equipment is made as resistant to EMP as possible. The process of building in or adding such resistance is known as "hardening". EMP hardening can be extremely expensive (and virtually impossible in the case of large structures such as power lines) and therefore it is only military rather than civilian equipment which is hardened.

Almost all items of military equipment currently produced are hardened against EMP effects, although there are obviously degres of hardening and complete protection may be impossible. The computers in missiles and military aircraft are usually especially well hardened against EMP, but the problems presented are very different from the hardening of, say, 100 000 army radio receivers.

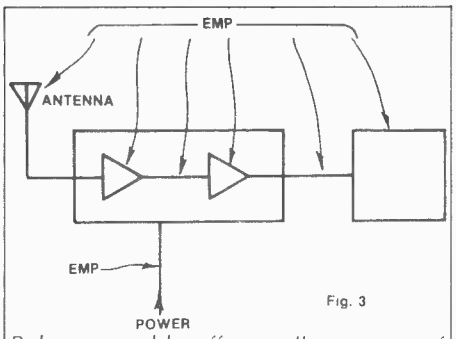


Fig. 3

Pulses would affect all stages of electronic equipment. Fig. 4 shows the effectiveness of various shielding materials.

EMP may affect a simple piece of equipment at many points as indicated in Fig 3. Some manufacturers such as the MO Valve Co of London and Siemens of Munich manufacture gas filled surge protectors which can operate at extremely high speeds (under 1 ns). If connected between sensitive points (usually all signal and power inputs and outputs) and ground, they will short circuit the EMP so that it is unlikely to damage the equipment.

Really thorough screening and double screening helps to provide at least some protection against EMP. Siemens produce rooms shielded like a Faraday cage, but use welded iron shields and copper screens to meet various requirements. This company considers wire mesh screening inadequate. As indicated in Fig 4, a 6 mm network of 0.5 mm diameter wire in the form of a double screen is not adequate in upper radio frequency regions.

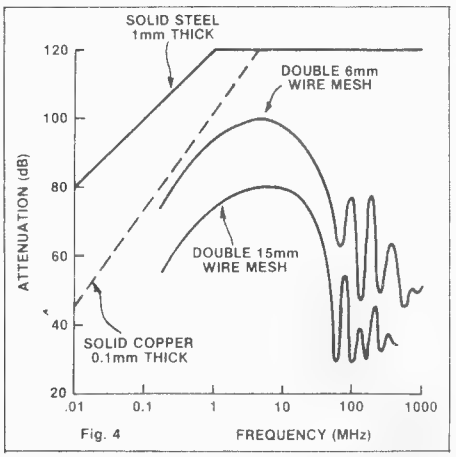


Fig. 4

For their most sensitive computers, the Swiss have decided that it is more economical to place them some 600 m under the Alps than to thoroughly screen them on the surface. In the case of power and telephone lines, it is probably not economically feasible to bury them over long distances at an adequate depth, so surge arrestors are more practical for this type of problem.

The use of fibre optics for long distance communications, and even for short distances between units which are EMP hardened, is basically very attractive because fibre optics do not pick up EMP and can carry high data rates. However, fibre optics are somewhat susceptible to moderate doses of nuclear radiation which reduces their transparency, at least for a time. Much work is being carried out to try to develop fibre optics which minimise this problem.

Although the electronic systems handling the signal before it is converted into light pulses need careful EMP hardening, this may be carried out by using a shielded enclosure for the whole system with the power input protected and only the optical fibre emerging from the unit. Current military trends are very strongly towards using screened rooms for central transmission through optical fibre cables.

TESTING

When one has finished a job in almost any field of electronics, the final stage is to test the equipment. Unfortunately it is most difficult to test the performance of the hardening systems used against EMP and, the larger the equipment, the more difficult testing becomes.

The last observed effect of EMP produced by an exo-atmospheric explosion occurred in 1962 when a 1.4 megatonne thermonuclear weapon was detonated about 400 km above Johnson Island in the Pacific Ocean. It extinguished street lights in Hawaii some 1300 km away and caused other unexpected results, yet the effects on local radio and radar were not very prominent, for reasons not fully understood Doubtless the sparse population of the area and the wide use of thermionic valve equipment played an important part in reducing the effects.

Following this, a theory of EMP generation was evolved in detail, but before the US could test this theory, it had signed an agreement not to perform atmospheric tests, although some initial tests were carried out using underground nuclear explosions which can generate a limited amount of EMP.

Most current EMP testing is carried out using EMP simulators which generate an electromagnetic field which resembles a nuclear EMP as closely as possible. Initially, simulators were able to test individual components only, but in 1980 the US Air Force Weapons Laboratory in New Mexico brought into operation an EMP simulator which can hold a B-52 bomber. It operates by discharging two 5 MV pulses into transmission lines surrounding the aircraft. The United Kingdom has three EMP simulators at its Atomic Weapons Research Establishment, Aldermaston.

All simulators are inevitably compromises between economy, the size of the equipment they can accept, and the problems caused by the intense electromagnetic fields which are generated in the vicinity. Pulses are often generated by discharging capacitors through a gas gap, but must have a very rapid rise time.

Although huge sums are spent on simulators, it is clearly impossible to construct one large enough to test a telephone or power line network. Work on screened cables has indicated that great improvements may be obtained against EMP — possibly up to 120 dB/m or more. However, much of the work on large systems remains theoretical.

The cost of satellite communications is falling so rapidly that military and civilian long-distance links are using this technique far more frequently. To some extent satellites can be hardened against EMP before launch-

ing and, unlike other long-distance communications networks, can be laboratory tested for the effectiveness of this hardening.

STRATEGIC IMPLICATIONS

In the event of a nuclear war, the availability of first class communications and reliable electricity supplies would be absolutely vital to the population surviving the first onslaught. These factors, together with ample computing power and vehicle reliability, would be essential to any nation requiring to make a nuclear response to the initial attack.

Nuclear EMP effects threaten to disturb the very sensitive balance of power which seems to have kept the world free from any major war since the end of World War II in 1945. Some people believe that no matter how much hardening is put into equipment, only a "use it or lose it" war philosophy can work. This can only lead to a "trigger happy" situation where ideas of "controlled" nuclear war give way to the older idea of Mutually Assured Destruction (MAD).

To make the situation even more delicate, there is the risk that a country may not even get the warning of a rocket carrying an EMP weapon entering its atmospheric space. Many satellites orbit the earth, and a suitable satellite with a nuclear charge could be exploded at will, reducing any warning time to milliseconds. Such a danger is thought by some people to make the idea of a "flexible nuclear weapon-for-weapon" response untenable, an all-out nuclear war being the only possibility. Who can forecast the position unless and until the effects of hardening systems have been thoroughly tested using exo-atmospheric nuclear explosions?

Although there remains much to be learned about the effects of EMP, the nuclear powers certainly have weapons which have been specifically designed for the purpose of paralysing the communications and mains power supplies of a country.

Except for the EMP effect, such weapons would not affect people or buildings and would not necessarily be regarded as a nuclear attack, so a conventional war could follow with one or both sides having lost much of their communications and power systems. The limited number of hardened military systems which survived would be over-burdened by the demand for communications and even emergency fire and ambulance requirements would have to give way to military communications needs.

As the rise time of an EMP is in the nanosecond region, the whole communications system of a nation could be lost almost instantaneously. If the nation detected the rocket carrying the EMP weapon, it could have a warning period of perhaps a few minutes — if that long — before the EMP wiped out control over its armed forces. Many experts therefore fear that this could result in a philosophy of ordering a full scale nuclear response in the very early stages of a suspected attack.

It is horrific to think about the implications of such a situation which could result in a full nuclear war, perhaps in error, because one nation sends a rocket carrying an unknown, and possibly innocent, payload above the air space of another nation. Much depends on the amount of confidence the "attacked" nation has in its hardened communications systems, but no one really knows the exact performance of such systems because of the atmospheric nuclear test ban agreement.

It is significant that Edward Teller (known as the "father" of the US hydrogen bomb) is reported to have said that he would like to roll back the test ban so that more can be learned about EMP and its implications for the balance of power. The US is ready to carry out exo-atmospheric nuclear tests for EMP investigations and to check effectiveness of EMP hardening if ever the partial test ban treaty should be lifted.

Reprinted by arrangement with Electronics Australia Magazine.

AR

ADVANCED ELECTRONIC APPLICATIONS

Computer Patch Interface model CP-1

Now you can easily convert your personal computer and transceiver into a full function RTTY station with the new CP-1 Computer Patch interface and appropriate software and cabling. The CP-1 is a professional quality RTTY CW terminal which cuts no corners on sensitivity, selectivity and reliability. Software packages include split screen operation and large type-ahead and message (brag) buffers at all the common RTTY and CW speeds.

The CP-1 Computer Patch is easy for an inexperienced RTTY operator to hook up and operate, but will still appeal to the more experienced and sophisticated RTTY user. The CP-1 is a moderately priced high performance, feature packed unit, which utilises reliable innovative design in the style you have come to expect from Advanced Electronic Applications. It is priced competitively with other popular units, but includes many extras not offered by them.

With the tremendous price drop in personal computers, your total system cost is far below that of dedicated RTTY CW systems which offer few, if any, additional features. No computer programming knowledge is required to use the CP-1 with your computer and you will still have the opportunity to use your personal computer for a variety of unrelated functions.

The CP-1 demodulator provides greatly improved performance compared to popular single channel RTTY detectors. An easy to use magic-eye bargraph tuning indicator gives the closest thing to scope tuning, but separate Mark/Space scope output jacks are also provided. A state-of-the-art multi-usage active filter is incoporated offering pre and post limiter filtering. Floating comparator (automatic threshold) circuits give the best possible copy under fading and weak signal conditions.

Additionally, the CP-1 offers a variable receiver shift capability for any shift from 100 to 1000 Hz with a NORMAL REVERSE tone selector switch on the front panel. Power requirement for the CP-1 is 16 VAC.

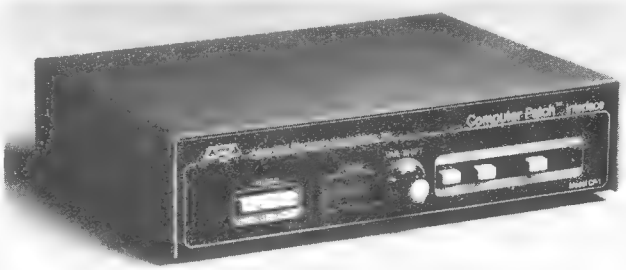
Price: $375.00 (plus P&P).

For the Commodore 64 Owner
THE AMTOR BREAKTHROUGH

AMTORTEXT is a LOW COST software package that will allow the CP-1 and Commodore 64 computer to be used as a multi-mode AMTOR TERMINAL. Check the outstanding features:

- KEYBOARD OVERLAY instructions (eliminates constant referral to manual)
- STATUS INDICATORS on screen
- Easy to follow MENU
- ARQ, MODE A-MASTER OR SLAVE
- FEC MODE B
- MODE L (LISTEN TO MODE A)
- SPLIT SCREEN with 2000 CHARACTER TYPE AHEAD transmit buffer
- WORD MODE for error correcting with DEL KEY until space or CR is sent
- REMOTE ECHO shows characters transmitted as they are received by other station
- Easy entry of your SELCALL for automatic response to ARQ calls
- BREAK-IN MODE to interrupt sending station
- LTRS FIGS REVERSE for assistance in MODE L synchronising
- TEN MESSAGE BUFFERS for 256 characters each
- AMTOR timing synced to host computer internal CRYSTAL OSCILLATOR
- PROGRAMMABLE TRANSMIT DELAY can be saved to tape
- AUTOMATIC PTT
- POWERED BY HOST COMPUTER
- Includes INTERFACE CABLE for AEA model CP-1 COMPUTER PATCH

Price: $108.00 (plus P&P)

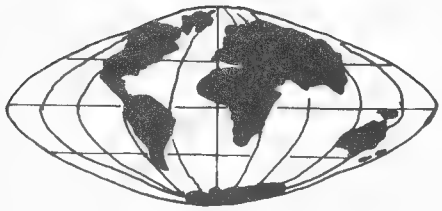


Hy-Tech DISTRIBUTORS

Building 51, Archerfield Aerodrome, Qld. 4108 Australia
P.O. Box 136, Archerfield, Qld. 4108 Australia

Telephone: (07) 275 3030
(07) 277 5624

Telex. AA43318 RADCEN



VHF UHF - an expanding world

Eric Jamieson, VK5LP
1 Quinns Road, Forreston, SA 5233

All times are Universal Co-ordinated Time, indicated as UTC

AMATEUR BAND BEACONS

FREQ	CALLSIGN	LOCATION
50.005	H44HIR	Honiara
50.008	JA2IGY	Mie
50.020	GB3SIX	Anglesey
50.060	KH6EQI	Pearl Harbour
50.075	VS6SIX	Hong Kong
50.945	ZS1SIX	South Africa
51.020	ZL1UHF	Auckland
52.013	P29SIX	New Guinea
52.150	VK0CK	Macquarie Island*
52.200	VK8VF	Darwin
52.250	ZL2VHP	Palmerston North
52.300	VK6RTV	Perth
52.320	VK6RTT	Carnarvon
52.350	VK6RTU	Kalgoorlie
52.370	VK7RST	Hobart
52.420	VK2RSY	Sydney
52.425	VK2RGB	Gunnedah
52.435	VK3RMV	Hamilton
52.440	VK4RTL	Townsville
52.470	VK7RNT	Launceston
52.510	ZL2MHF	Mount Climie
144.019	VK6RBS	Busselton
144.400	VK4RTT	Mount Mowbullan
144.420	VK2RSY	Sydney
144.465	VK6RTW	Albany
144.475	VK1RTA	Canberra
144.480	VK8VF	Darwin
144.550	VK5RSE	Mount Gambier
144.600	VK6RTT	Carnarvon
145.000	VK6RTV	Perth
147.400	VK2RCW	Sydney
432.057	VK6RBS	Busselton
432.410	VK6RTT	Carnarvon
432.420	VK2RSY	Sydney
432.425	VK3RMB	Mount Bunninyong
432.440	VK4RBB	Brisbane
1296.171	VK6RBS	Busselton

The only alterations to the list this month is the removal of VK0AP from 52.100 and the substitution of VK0CK of 52.150 in its place.

David Rasch is the operator of VK0CK at Macquarie Island, and was formerly VK5CK, and has gone down to the cold country for twelve months or so. Talking to him on 20 metres (!) last Sunday he mentioned the 6 metre beacon was already going and would be operating on a continuous attending schedule. David will also be on the alert for any 6 metre contacts back to Australia or elsewhere, and being a truly keen VHF operator will give that side of his operating quite a high priority no doubt. As I will be speaking to David regularly I hope to keep readers informed of anything that transpires from down that way. Most of the usual 6 metre "season" will be behind us by the time you read this, but it is indeed fortunate David has been able to get set up in time for the Es period.

SIX METRES FROM CARNARVON

Andy VK6OX has written from Carnarvon to say 6 metres has been very quiet, with last summer producing the poorest Es conditions since the peak of Cycle 21. During June and July he had a couple of Es openings down south of him but nothing else.

Things have improved a little since winter, with the second half of September producing afternoon trans-equatorial (TE) openings to Japan. The 10th, 11th and 12th October have produced conditions good enough for all JA call areas to be worked.

Andy regrets he will be away from home for the Christmas period with a holiday in Canberra. By the time you read this he will be back home again but you may have worked him as VK6OX/1 as he intended getting on 6 metres from there.

TOWNSVILLE BEACON

My reference in the November issue that I had received a report of the destruction of VK4RTL (beacon) in Townsville by lightning, has brought a response from the Station Manager of the Townsville Amateur Radio Club, Roger VK4CD, that the beacon is still operating with a comment that Ross VK4RO at Ayr had said the output appeared to be down somewhat! So all seems well and hopefully all was well after the proposed visual checking.

Roger said he had heard that the 10 metre beacon to operate on 28.270 was soon to be ready for testing, and would eventually be mounted alongside the 6 metre beacon on Mount Stuart. Thanks for writing Roger.

TWO METRES AND ABOVE

Its refreshing to be able to report a bit of activity on two metres and above from VK5 to VK3 once again. With the advent of a fairly stable high pressure system on 23/10 it looked promising. The VK5RSE beacon was S6-7 which is unusually strong for that beacon, and VK5RMG the Channel 6 repeater at Mt Gambier was also accessible from here with full quieting. So everything looked right.

Trevor VK5ATD at Rendelsham in the south east was the first station to be worked on 144.1, with signals 5x9 at 1015 UTC, followed a few minutes later at 5x7 on 432.1. Then it was my old friend Roy VK3AOS at 5x9, VK5AKJ, and VK5AXV (formerly VK3AXV and now at South End in the south east). Later Trevor VK5TH came out of the woodpile and we had a contact on 144.1. Then David VK5ZOO was worked mobile through Ch 6 while coming home from Victoria. At 1338 it was time to look north and VK5QM and VK5BG at Crystal Brook were worked via Ch 2 repeater. Then back to the South East for a few more contacts including one to Mitch VK5AZM in Adelaide whom I worked via the Mt William repeater Ch 7!

Mick VK5ZDR had already been savouring the good conditions by getting in the act during the morning of 23rd October with contacts to VK3 stations. Mick was having more luck with the 432 contacts than I was, and successfully worked VK3AOS, VK3YLV and others.

Next morning, still 23rd October UTC day but at 2316 Trevor VK5ATD was there again and we had 5x9 contacts on 144.1 and 5x8 on 432.1 and eventually worked crossband for a while.

The good conditions continued on 25th October with Kevin VK5OA in Mt Gambier being worked on 144.1 at 1300, VK5DK at 1302, VK5TH at 1304; the signals from VK5DK were over S9. At 1310 VK5DK was worked on 432 at 5x5, at 1314 he was still 5x9 on 144. At 1341 it was time to work Les VK3ZBJ at Frankston up to 5x7 on 144, and then at 1427 I was immensely pleased to work Les for the first time on 432 both ways. Signals were not strong but we made it! While all this was going on Mick VK5ZDR was having a share of the fun, and was noted working VK3YLV, VK3DHW, VK3ZBJ and others on both 144 and 432.

Two comments arising from all this activity: Les VK3ZBJ said he was hoping to be operational on nine bands during the Ross Hull Memorial Contest this year, so would be looking to give the VK6 boys a hurry up in that contest. The other point was that on 23rd October, when I worked Trevor VK5TH, he said he had just come back on the band after a break of 2½ years, during which time he had built a new house not far from his brother Colin, VK5DK at Yahl, near Mt Gambier. Looks like there will have to be some sorting out down there as to where beams are pointed and when!

Des VK5ZO in Mt Barker commented that on 25th October he had worked Les VK3ZBJ on 432 after trying to do so for three years! Les also commented he had been having a ball on Oscar 10, and mentioned a contact he had made to KL7WE who was using a dipole antenna in his basement shack while Les used a 2 element beam!

NEWS FROM NEW SOUTH WALES

Thanks to another letter from Gordon VK2ZAB, we are being kept informed of what is happening in NSW on 144 and 432 MHz. It has had a side effect in that Gordon feels the publicity given to the happenings in that State has been directly responsible in furthering the interest of VHF there — I guess that's what its all about anyway!

Mindful of too much eventually becoming boring, Gordon has decided this month to limit his report to those contacts and events which he considers to be of particular interest, as all the usual contacts are going on regularly.

Firstly, there are the 2 metres and 70 cm skeds with VK3UM on each Saturday and Sunday morning at 2230. They are attracting several VK1s and VK2s. Contact is always made on 2 metres between Doug and Canberra as well as Sydney. On 2nd October Doug VK3UM was heard by Kerry VK2BXT

and Wally VK2DEW when they were portable on Mt Canobolus in the central west of NSW as well as bits and pieces of his 2 metre CW calls by Don VK2ADY in Tamworth.

John VK2YEZ in Griffith has been getting into Sydney and was 5x3 to VK2ZAB on 10th, 12th, 19th, 24th, 26th and 31st October; ie Monday and Wednesday nights at 1130. He has also worked VK3UM and VK3ZBJ on both 2 metres and 70 cm.

Max VK2ZLX at Culburra on the south coast was 5x6 on 15th October the first contact with him for some time. Bill VK2ZCV at Port MacQuarie was 5x4 on 18th October and also appearing after a long absence. Bill was relaying comments from Tom VK2DDG at Byron Bay while he and Gordon tried to establish contact on 70 cm. Jeff VK2EJJ at Wagga now has a 150 watt linear and was 5x5 in Sydney on 11th October.

On 22nd October Richard VK2XRC was on 2 m SSB as a marine mobile on the yacht "Destiny" while competing in the Sydney to Lord Howe Island race. Gordon VK2ZAB worked him at 5x9 when he was just off the coast, but their times could not be matched to try it from the Lord Howe Island end.

Graham VK2MQ at Moree has been hearing VK2ZAB frequently but contact is only made occasionally, as Graham's 25 watts isn't quite enough power. The northern stations were clearly in evidence during October with VK2AKU at Narrabri, VK2ZQX and VK2KAY at Gunnedah, VK2XDH at Uralla, VK2ADY at Tamworth and VK2DSG at Duri on 2 metres frequently. Contacts were also made with VK2KAY and VK2ADY on 70 cm.

VK1RK, VK1KAA, VK1VP, VK1CJ, VK1ZIF, VK1BG and VK1ZQS are all putting 2 m SSB signals into Sydney plus 70 cm from VK1VP and VK1BG.

In Sydney VK2QP has 150 watts on 2 metres, VK2AAS has 100 watts, VK2EDB 100 watts, VK2ZSC 150 watts, VK2KTQ 120 watts, VK2YIF 100 watts and VK2ZAB 400 watts PEP, and all have been active during October, amongst many others who may not be running so much power.

Finally, Gordon reports having just received advice that Doug VK3UM has worked into Canberra on 70 cm SSB, and he hopes he will tell us about it! Gordon also mentions that Neville VK2DR at Bathurst has been on 2 m SSB a few times during October, being another former regular returned to the real world!!

Thanks again Gordon, it means that with all that activity in your state that when conditions are right many possibilities exist for inter-state contacts from many directions, so we are all hoping for that time soon!

SIX METRE STANDINGS

From the November 1983 issue of "QST" and "The World Above 50 MHz" comes the latest Six Meter Standings Box and it is quite an eye-opener. The list conforms to the latest ARRL DXCC Countries List and is as received of 16th September, 1983.

Heading the list is JA4MBM with 77 countries claimed and 76 countries confirmed, followed by VE1YX with 75 (72); both of these have confirmed two-way contacts with all continents; then comes KH6IAA 71 (68), K8WKZ 69 (68), LU3EX 68 (60), VE1BNN 67 (65), W5VY 67 (63), K5FF 66 (63), JA1RJU 65 (65), WD4IYS 65 (53), W4OO 65 (61), W2IDZ 64 (60), JA1VOK 63 (63), W5FF 63 (59), ZD8TC 62 (62), WA4OWO 62 (54), JA3EGE 61 (60), W3XO 60 (52). So there are three stations over 70 countries, and seventeen stations between 60 and 69 countries. A most creditable effort by anyone's judgement. Those of us who live in the Southern Hemisphere would never have thought it was possible, and probably never will be for us, but congratulations to all above.

No less of an achievement must be those who have not yet reached 60 contacts, but between 50 and 59 there are thirty nine stations, between 40 and 49 there are sixty one stations, 30 and 39 there are eighty two, 20 and 29 there are seventy seven and then a great number under 20 countries.

The first VK station to be listed is VK2BA with 28 countries, then VK2DDG with 22, and there are others under 20. The first ZL is ZL1MQ with 33. Eight stations from G land are included, indicating some of those privileged to be operating on 50 MHz have managed some contacts, notably GI3SZC with 8 down through the numbers to GM4FZH with 3. There are quite a lot of European stations with listings of 10 metres to 6 metres crossband with G4JCC heading the list with 32.

All this of course, now leads up to our own Australian listing which will be appearing next month for the first time, and this will be forwarded to Bill, W3XO of "QST" so he may include those he desires from our list into his next list which will appear in May, 1984. Our next Australian listing will be in August 1984, which will give time for corrections, alterations and additions to be made as a result of the publication of the first list. Later on its is hoped to be able to do something about 2 metres and 70 cm listings, just in what form has not yet been decided, but you will be advised in due course. Those bands do not have the opportunity for such world wide coverage.

MOONBOUNCE REPORT

From the November 1983 issue of "The Propogator" comes news of the confirmation of the contact between VK2AMW and Z25JJ on 1296 MHz EME during September by the exchange of QSL cards. Contact with the same station on 432 MHz had been made previously. QSL cards are now held from twenty four stations in 11 countries for 432 MHz EME contacts.

Work is still proceding on the finishing touches to the rebuild of the VK2AMW dish antenna, hopefully completed by 26th November which coincides with the second weekend of the ARRL EME Contest, a time when most of the 1296 MHz stations ar likely to be on.

We all wish Lyle VK2ALU and his team of helpers every success and hope the weather holds good long enough for them to achieve their objective of being on in time.

NEW PREFIXES FOR NEW ZEALAND

From 1st January, 1984 it appears there will be additional prefixes for certain area of New Zealand and its territories. The October 1983 issue of "Break In" bears a letter from the Director of Telecommunication Operations which outlines the proposed changes, which are advised hereunder for your information.

ZL0: For visitors to New Zealand (no change)
ZL1-4: For mainland New Zealand, ie North Island, South Island, and Stewart Island (no change)
ZL5: Antarctica (no change)
ZL6: New Zealand Intruder Watch (no change)
ZL7: Chatham Islands
ZL8: Kermadecs
ZL9: Auckland/Campbell Islands
ZK1: Cook Islands (no change)
ZK2: Niue (no change)
ZK3: Tokelau Islands (previously ZM7)
ZK0, ZK4-9: Reserved

The ZM0-9 series will continue to be held in reserve and used on special occasions at the discretion of the Post Office.

While still in New Zealand, I have a report of a beacon with a ZK2 callsign on 51.170 MHz. Hopefully, with an increase in Es contacts likely in November and December it might be heard and confirmed. In the meantime it will pay you to have a look around that frequency when the band opens to the east.

GENERAL NEWS

There have been a number of 6 metre Es openings so far, with VK2 and VK4 being the areas most heard, a good one being on 2nd November . . . Bob VK5ZRO has now worked 45 countries via Oscar 10 comprising between 500 and 600 overseas contacts . . . some operators have more than 60 countries . . . Bob VK5ZRO and Don VK5ZRG continue to have almost nightly contacts on 144 and 432 MHz and helping to keep the bands alive here in VK5 . . . A GasFET preamp is to be installed as a masthead amplifier on 432 MHz at the VK5LP establishment which should ensure the existing heliax does its job — should be there before the end of November. A similar amplifier on 2 metres does an outstanding job for the 13 over 13 stack!

It's early times yet, but the little I have heard since publishing details of the Locator Squares System indicates general approval and several people have already worked out their positions from the system.

In due course, if enough operators show interest, we may be able to take up the offer of Steve VK5AIM for a suitable certificate for working "x" number of squares, maybe even a weekend contest of some sort could be organised, but first, let me have a few letters stating your views on what looks like eventually becoming a world-wide system for indicating locations.

That seems to be about all the news for this month — as you can see there has not been a great deal of 6 metre activity, but that should come in time for the writing of the notes for the February issue.

I hope Father Christmas or the New Year Fairy brought you something of interest, like a new transceiver for you and a new dishwasher for the dear lady — that order of events has been known to occur before — ask VK5ZMW!

Closing with the thought for the month: "While it is well enough to leave footprints on the sands of time, it is even more important to make sure they point in a commendable direction." 73. The Voice in the Hills.

AR

VHF COMMUNICATIONS MAGAZINE — 1984 Subs
Airmail . . . $13.20
Surface . . . $9.00

HERE'S RTTY!

Bruce Hannaford, VK5XI
57 Haydown Road, Elizabeth Grove, SA 5112

RTTY picture courtesy Steve VK2BGL.

SIMPLE RTTY RECEIVERS

I have previously pointed out that very simple FSK transmitters for HF bands can be used for RTTY, much the same thing can be said for RTTY receivers. You may ask *"Why bother about simple transmitters and receivers when a manufactured transceiver can be bought at a reasonable price?"* Well a RTTY station needs more than just a transceiver and RTTY operators may wish to spend most of their money on modern RTTY equipment such as a RTTY computer. The combined cost of a transceiver and a RTTY computer is quite out of the reach of many people. Computer type RTTY gear has many useful features not available with mechanical systems but the cost may well equal that of a HF transceiver. If simple home brew transmitting and receiving equipment is used the total cost of a computer type RTTY station can be kept to about the same as a SSB station.

As we consider what is needed in a FSK HF bands RTTY receiver the most important requirement will be high stability. High selectivity is useful to reduce QRM and also to reduce noise level on weak, marginal signals but often not essential for reasonable strength signals. It is easy to get reasonable results using quite simple receivers, one such system is to use a Direct Conversion DC receiver. I have as an experiment used World War 2 Heterodyne frequency meters adding only an external antenna tuned circuit to the meter input and an audio amplifier from the earphone output. These very stable oscillators are suitable for frequencies up to about 14 MHz (sometimes using harmonics). The units used were the Australian Class C Wavemeter and the American BC221.

Of course there are some disadvantages with DC receivers such as the problem of getting enough audio gain without hum and microphonics. Actually as you are substituting audio gain for RF and IF gain you need quite a lot of it and this is where the problem lies. I found that with valve circuits it was necessary to use an RF amplifier stage in front of a frequency converter thus reducing the amount of audio gain needed to a workable amount, also at the same time improving immunity to cross modulation etc. With transistor circuits microphonics and hum problems are of course much reduced.

An alternative approach is to use a cheap AM type HF bands receiver, the main requirements being reasonable sensitivity and not too many image frequency responses. Instead of adding a BFO at IF frequencies to obtain the heterodyne tones needed for RTTY, CW and SSB an HF oscillator is used at the incoming signal frequency. This is loosely coupled to the receiver HF mixer or to the antenna if the former is not convenient. Of course this HF oscillator needs to have excellent stability, be fed from a voltage regulated power supply and its output level or coupling needs to be readily controllable. On bands such as 10, 15 and 20 metres it will normally need to be a heterodyne oscillator using a crystal near the required frequency and this being mixed with a comparatively low frequency VFO the desired output frequency being selected by a tuned circuit.

With the DC or AM receivers their RF circuits will be tuned to the desired reception frequency and the final tuning will be done with the HF oscillator. In the case of the DC receiver the RF selectivity will be low, perhaps a 100 kHz Pass band and with the AM receiver usualy about 10 kHz. With the RF circuits set for reception at the right frequency the HF oscillator is tuned across this frequency until a spot is found that gives good readable copy. It will be possible to copy RTTY, CW and SSB. Because of the low RF and/or IF selectivity an audio image problem will be apparent, you can get a beat note on either side of the HF oscillator frequency. This "twin channel" reception works fine provided the unused channel is vacant but in crowded band conditions this will often not be the case. This can be most disconcerting for SSB but it is not such a problem for RTTY if a typical modern demodulator unit is used. With RTTY you normally have a choice of high or low tones and also a choice of normal or reversed sense RTTY (right side up or inverted). This means there are four possible combinations, normal, high or low and reversed high and low. Each one of these will require a different HF oscillator setting for correct tuning and it would be most unlikely that all these would give "twin channel" QRM at the same tone frequencies that you are using. Of course the audio filters in the RTTY demodulator are normally quite sharp and will largely ignore all signals except the audio tones needed.

I take my RTTY audio off the voice coil of the receiver speaker and at times a dog pile of QRM can be heard but the filters accept only the RTTY tones and usually readable or even perfect copy will still be obtained. Well if you get "twin channel" QRM you use a different one of the four combinations to dodge it and only a slight change in the HF oscillator tuning is necessary. No doubt those who normally use only the best of modern receivers will be appalled at the thought of using such a system but with a little patient practice it all becomes quite easy and good results can be obtained. By the way this four choice system can also be useful with normal SSB transceivers having a 2-3 kHz pass band as near-by QRM can often be eliminated by using the other side band and the reverse or inverted sense position also changing tones can often make a difference.

For those who like figures to prove everything, here is a practical example of HF receiver oscillator frequencies for a given incoming RTTY signal of constant frequency. The incoming RTTY signal is on 7045.000 kHz using normal sense with a 170 Hz shift. Mark is 7045.000 Space is 7044.830 kHz. In the demodulator high tones are mark 2125 and space 2295 Hz and low tones are mark 1275 and space 1445 Hz.

HF oscillator settings will be as follows — High tones normal 7047.125, Low tones normal 7046.275, Low tones reversed 7043.555 and High tones reversed 7042.705. The method of arriving at these figures is as follows — With normal sense RTTY add the mark audio frequency to the mark RF frequency then check the results by adding the space audio frequency to the space RF frequency. With reversed sense RTTY subtract the space audio frequency from the mark RF frequency and check by subtracting the mark audio frequency from the space RF frequency.

When the HF oscillator has been correctly tuned to receive a signal, check that you are using the best amount of oscillator injection giving good results without desensitising the receiver by overloading the AGC and finally check the RF circuits tuning for best signal strength or least QRM. The receiver stability is completely dependent on the HF oscillator and peaking the RF, DC or AM receiver circuits will normally have no effect on the frequency of the signal tuned in.

Drift in the AM receiver will only affect the volume and not the audio pitch determined by the HF oscillator tuning. As AM is rather broad, band spread is not very important in the AM receiver, but it will be in the HF oscillator which does the real tuning of the incoming signals. With the AM receiver correctly tuned it will be possible to tune up or down a few kHz using only the HF oscillator, the pass band being probably about 10 kHz wide. With the DC receiver one RF setting in an amateur band will probably suit the entire band with no further tuning being necessary.

In conclusion I trust these articles will have encouraged at least some to do a bit of home

brewing of RTTY transmitters and receivers as quite reasonable results can be obtained with very simple circuits. I would like to thank all who have written encouraging letters to me re these articles, I have tried to explain things simply for beginners and others wishing to gain a basic knowledge of RTTY. This is the last of my regular monthly contributions on RTTY, I feel I have covered the groundwork and that future articles could be of a more advanced technical nature. Many more advanced subjects remain to be covered and there are many well qualified people who could submit articles concerning them. I urge such to put pen to paper so we can benefit from your experience.

GENTLEMEN'S AGREEMENT

I note in November AR a reader's letter on page 70 deploring the change from "CW only" to "Narrow-band modes" (see page 122 of the 83/84 Call Book). The writer points out that some day Baud rates may increase to perhaps 1500 Bauds and as such signals would no longer be narrow-band modes they should not be allowed alongside CW. I believe the writer's fears are groundless as the term "narrow-band modes" means what it says and very high Baud rates would not be narrow-band modes. I have every confidence that when the need arises to limit the Baud rate classified as narrow-band then the WIA will do just that. In the meantime narrow-band obviously means something narrower than an SSB signal. The writer should be glad that the WIA in their wisdom changed the original wording of my motion (first put to the VK5 Division) from "Telegraphy only" to "Narrow-band modes" as telegraphy only would not have given the same protection re band width. It is my fervent wish that all will study the 83/84 Call Book band plans and really try to make them work.

73 from Bruce VK5XI

AR

CONTESTS

Reg Dwyer, VK1BR
FEDERAL CONTEST MANAGER
Box 236, Jamison, ACT 2614

JANUARY

7	Ross Hull Contest ends
7	73 40 metre World SSB Test
8	73 75 metre World SSB Test
14-15	73 160 metre World SST Test
21-22	White Rose SWL Contest
28	French CW Test
27-29	CQWW DX 160 metre Test

FEBRUARY

4-5	French 40 metre Phone
11-12	John Moyle National Field Day
11-12	Dutch PACC Test
18-19	ARRL CW DX Test
25	73 RTTY World Test
25-26	CQ WW 160 metre CW
25-26	RSGB 40 metre CW

MARCH

3-4	ARRL DX Phone Test +
10-11	QCWA Phone QSO Party +
17-18	BARTG RTTY Test +
24-25	CQ WW WPX SSB Phone Test +

APRIL

7-8	Polish CW Test +
14-15	Polish Phone Test +

MAY

26	CQ WW WPX CW Test +

Note * The + designates that the contest has not been confirmed.

AR

RESULTS OF THE 7TH WEST AUSTRALIAN ANNUAL 3.5 MHz CW AND SSB CONTESTS

	CW CONTEST		*PHONE CONTEST*
VK6QS	1488 Points	VK6KIE	11856 Points
VK1GP	1404 Points	VK6NCR	6208 Points
VK6AFW	1398 Points	VK6RG	5400 Points
VK6HX	1250 Points	VK6QS	5096 Points
VK6CO	1144 Points	VK6NHD	4214 Points
VK4NUN	768 Points	VK6AFW	3528 Points
VK5GZ	714 Points	VK6QH	1008 Points
VK6RF	464 Points	VK5GZ	432 Points
VK6QH	420 Points	VK2BQS	168 Points

The two contests were enjoyed by all who took part though the turn out was not as good as last year. Conditions on both weekends were poor with very high noise levels and static crashes at 5-9, in WA. There were also very high winds causing power cuts. Locally power was off for 2½ hours right through the contest.

C Waterman VK6NK
CONTEST ORGANISER

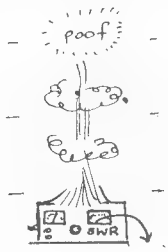
AR

BUYING, SELLING or WANTING?

Check HAMADS first.
Eight lines free to all WIA Members.

THE RADIO REPAIR SHOP

For quick and reliable servicing of
HF, VHF & UHF TRANSCEIVERS



Contact
ANDY VK3DPJ
Telephone: (03) 553 3483

A Call to all holders of a
NOVICE LICENCE

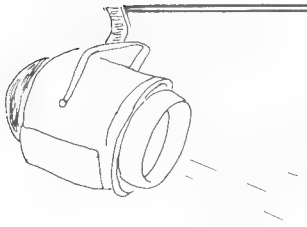
Now you have joined the ranks of Amateur Radio, why not extend your activities?

THE WIRELESS INSTITUTE OF AUSTRALIA
(N.S.W. DIVISION)

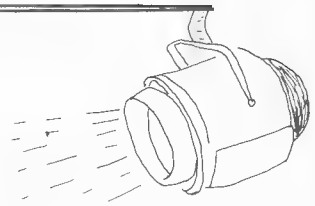
conducts a Bridging Correspondence Course for the A0CP and LA0CP Examinations.

Throughout the Course, your papers are checked and commented upon to lead you to a SUCCESSFUL CONCLUSION.

For further details write to:
THE COURSE SUPERVISOR, W.I.A.
P.O. BOX 1066,
PARRAMATTA, NSW 2150



SPOTLIGHT ON SWLing



Robin Harwood, VK7RH
5 Helen Street, Launceston, Tas 7250

Well, another year has commenced and I wish to pass on to you my best wishes for a Happy New Year and hope that your listening will provide as much pleasure and enjoyment from the hobby as I have had.

AMATEUR TELETYPE

A few months ago, I mentioned that I had come across AMTOR signals in the amateur bands, and I had not come across any articles explaining how this mode operates. Thanks to Syd Molen, VK2SG, I am now able to understand its operation. The name AMTOR is an acronym for Amateur Micro-processor Teletype by Radio. It is a 7 bit code, consisting of three 0s and and four 1s, but will not print up on normal RTTY gear without an AMTOR box. It is basically an error correction or "hand-shaking" block of three characters. After every block is sent, the receiving station automatically transmits back to the sender the block. If this does not tally, the originator, *also known as the Master*, will transmit the sequences until they do fall into line with the receiving end *known as the Slave*. The copy is not printed up until all has been verified as correct.

This mode is a complete full break-in operation, which allows the Slave to make queries or pass comments along the way. Its main advantage is that if contact is lost mid-word, when the signal returns the text will appear as if there had not been a break in the contact.

All that is required to send AMTOR is a RTTY terminal, either mechanical or electronic, and an AMTOR box. Those with a 6800 computer can programme in the AMTOR code to do the same function as the AMTOR box.

Naturally, the transmit/receive relays work overtime. It is recommended that mechanical relays be replaced with electronic ones. This will make a considerable difference with relay noise. The speed of the transceiver switching is critical in AMTOR. A typical pulse lasts for 210 milliseconds on send and 240 milliseconds on receive. Your transmitter/receiver must be able to switch in these times. As well it must be able to switch to at least half-power on transmit in 10 to 15 milliseconds and recover audio on receive in a similar period. The AGC function is disabled to assist this. Synchronisation is therefore very critical between the Master and the Slave with the latter synchronising exactly with the pulses sent to it.

Despite these limitations, AMTOR is extremely accurate and interfaces with commercial systems, the standard being exactly the same (CCIR 476-1) with 170 Hz frequency shift and at 50 Baud.

AMTOR is in two forms. Mode A is referred to as ARQ. This is the common form used by amateurs. A second form is known as FEC or Forward Error Correction. This is sent without any breaks with two streams of AMTOR code. It is heard mainly from commercial stations where there are a number of receiving stations. It is not a "hand-shaking" like ARQ because it is physically impossible for all receiving to reply, so the initial pulse is repeated again some 350 milliseconds later, which gives the receiving stations two chances to obtain the copy. If there is difficulty obtaining the text, the stations will revert to ARQ. A third from Mode L is a listening only mode. However, a good signal, with consistent strength is required as garbled or lost copy cannot be corrected.

If you are wondering what AMTOR sounds like, I suggest that you tune to 14.075 MHz + QRM where the sixteen or so VK stations communicate with amateurs equipped with AMTOR. Alternatively you can tune to the top end of the Marine radio allocations, eg 8.7 MHz where some coast stations transmit on AMTOR in both formats as required.

Incidentally the names of SITOR, VECTOR, MICROTOR are the same, just different trade names. For further details on AMTOR I suggest that you contact Syd at 13 Pendle Way, Pendle Hill, NSW 2145 and please include $1.00 to defray postage.

SMARTER SWL QSLING REQUIRED

Recently I received a note from Hugh VK6FS and Neil VK6NE. These gentlemen have been responsible for some of the QSLs for the Heard Island DXpedition last year. The subject was the poor standard of QSLs received from SWLs for the VK0HI/0CW operation. Clearly many had difficulty in hearing Heard but no problems with the stations calling. There were many reports, mainly from Eastern Europe, which simply did not tally with the logs. For example, there were two reports from Czechoslovakia claiming to have heard VK0CW working DL8OEP on 3.5 MHz CW. BUT THERE WERE NO OPERATIONS AT ALL ON 3.5 MHz FROM EITHER STATION.

It is understandable that, because of the exotic nature and the comparative rarity of stations operating from Heard, some individuals may have succumbed to the practice of forwarding a fictitious report in the hope that they would get a VK0HI QSL to boost their totals.

Unfortunately this practice is not confined to reports to amateur stations. Several DXers were expelled from clubs after obtaining a QSL from a rare broadcaster and filling it in, claiming to have heard it. Unfortunately, for them, it simply was not possible for the respective broadcaster to be heard at the time claimed and the individual was found out and drummed out of several clubs.

A report to an amateur station must contain the following information. Firstly, the name of the station, the frequency, the date/time in UTC, the callsign of the station being worked, the signal strength at your location, any QRM, QRN, QSB etc, brief details of what was happening, details of your receiving equipment, antennas. Always include your name and address clearly on the report and make it neat and tidy.

With reports sent to DX stations, if sent direct, one should include International Reply Coupons (IRCs) or mint stamps to facilitate return postage and an SAE is always helpful. The WIA QSL Bureaux are another way, that is more economical, although it does take longer to receive a reply.

With reports to local stations, I recommend that these be confined to reports on VHF or if there is something special about the operation. As well, refrain from reporting stations in your immediate area, for they are aware that they are getting out. A QSL would be regarded as a waste of time, unless you have noted something the amateur is not aware of eg an audio fault, break in his antenna etc. The listener cannot **demand** a QSL to verify that he/she heard the station as the amateur is under no obligation to do so, although it would be courtesy to do so. If an amateur receives a report which does not tally with his logs, he could return the report indicating why it could not be confirmed. If you do report local stations direct, please include SASE. The cards could also be forwarded via the Bureaux, but not all amateurs want QSLs.

Following is Hugh and Neil's report on SWLing for Heard.

SHORT WAVE LISTENING — HOW NOT TO

Details of some of the SWL reports received for VK0HI and VK0CW.

HA5-xxx reported G3VXZ and G3XQU QSO with 0HI 14SSB. G3XQU did not appear in the 0HI log + 30 minutes of time stated.

HA8xxx reported G4CNY QSO with 0CW 14CW. G4CNY did not appear in the 0CW log on this date/time.

Y2-xxxx/G reported DK5XO and DJ4ZN QSO with 0HI 14SSB. DK5XO did not appear in the log.

Y2-xxxx/E reported QSO of EA6NG and DJ1NY with 0HI 14SSB. Neither of these stations worked 0HI this date/time.

Y2-xxxxx/E reported DL7KH and DK1YK QSO with 0CW on 14CW. DL7KH did not QSO 0CW at this date/time.

Y2-xxxx/F reported SM0LFB QSO with 0CW on 14CW. SM0LFB did not appear in the 0CW log this date/time.

DE0XXX reported PY4VX, KB3X and UB5ALE

QSOs with 0HI 14 and 7SSB. None of these stations had a QSO with 0HI at the times and dates stated for the valid reason that 0HI was NOT ON THE AIR AT THE TIMES/DATES HE CLAIMS TO HAVE HEARD THEIR QSO.

ONLxxxx reported ON5HU QSO with 0HI 14SSB. ON5HU did not QSO 0HI at the time/date stated.

OK1-xxxxx reports DJ4KD QSO with 0CW 14CW. DJ4KD was not in the log for the date/time stated.

OK2-xxxxx reports ZS3ZH QSO with 0CW 14SSB. ZS3ZH did not appear in the log this date/time.

OK2-xxxx reported DL8OEP QSO with 0CW on 3.5 MHz CW. DL8OEP DID NOT QSO 0CW AS THERE WAS NO OPERATION ON 3.5 MHz.

OK3-xxxxx reported DL8OEP QSO with 0CW on 3.5 MHz. DL8OEP DID NOT QSO 0CW AS THERE WAS NO OPERATION ON 3.5 MHz.

OK2-xxxx reported SM7ABO QSO with 0CW 7CW. SM7ABO does not appear in log this/date and time.

ALSO

ONLxxxx reported hearing VK6FS on 12/4/83 14SSB 0930UTC BUT HE DOES NOT GIVE ANY DETAILS OF WHO HUGH WAS SUPPOSED TO HAVE WORKED.

JA1-xxxx sent two cards reporting VK6FS working two valid stations. BUT *the reports which came through the Bureau OCTOBER 1983 were for contacts VK6FS had in APRIL and OCTOBER 1978. What use would reports like these be to any amateur?*

The callsigns of the SWLs have been suppressed to save them embarrassment but they are only a very small sample of the endeavours of SWLs to gain Heard Island QSL cards. It appears the SWLs have heard the stations calling HI but have not been able to hear HI itself.

73 de Hugh VK6FS.

I certify the details as outlined above are true and correct extracts of the SWL cards.

(Signed) N E PENFOLD, VK6NE

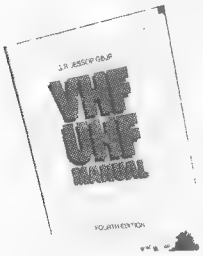
Well, that is all for this month. Until next time, the very best of listening and 73.

Robin, VK7RH

AR

BOOK REVIEW

Evan Jarman, VK3ANI
TECHNICAL EDITOR



G R JESSOP; G6JP

VHF-UHF MANUAL 4th Edition

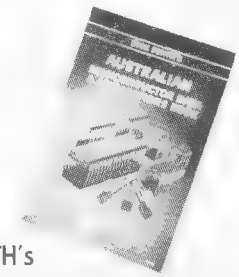
Radio Society of Great Britain

The fourth edition of this well known reference book is a welcome addition to the library. It is one of the best books on VHF-UHF technology available; an ideal reference for the serious amateur. The editor has kept the book up to date and incorporated articles of note from the various magazines around the world. Yes "Amateur Radio" has been used although our contributions were in the third edition too.

The book is a wealth of knowledge and generally provides far more information than most require. The exceptions are few. Most aspects of the VHF-UHF world are discussed, however topics such as television seem to have been ignored. With only five pages, the description of amateur TV is lean. The only reference to colour is three lines to say that it is a "relatively simple" addition. Other areas such as microstrip design and the operation of ring mixers need elaboration.

But these are minor faults and on balance take little from the book. The expanded chapters such as those on Microwaves, Space Communications and Integrated Equipment are most welcome. The major criticism of the third edition — too little on semiconductor circuitry — has been corrected although some valves still feature in certain circuits; probably for the last time.

AR



DICK SMITH's

AUSTRALIAN SEMICONDUCTOR DATA AND APPLICATIONS BOOK

Design information for current solid state devices is voluminous, and most of it for the more exotic circuitry. This book has taken information on the most commonly used components and combined it with some typical circuits to demonstrate their uses.

For those who like to experiment, rather than follow a published circuit without thought, the ideas in this book can be helpful.

While some arithmetic ability is helpful, mathematical rigour is avoided. The formulae given can be easily transformed into calculator keystrokes.

The book does not deal with radio circuitry instead confining itself to general hobbyist circuits. The devices covered are diodes, transistors, optical components, SCRs and triacs, operational amplifiers, voltage regulators and digital electronics; in particular. The components used tend to be those sold by the publisher's organisation.

While it is not a rigorous study, those who want to be able to see how to use these components for their own ideas will find the book helpful.

Our copy came from the publisher with a cover price of $7.95.

AR

QSP

A MESSAGE FROM THE NATIONAL EMC ADVISORY SERVICE:—

"From time to time Australian amateurs will hear, in various forms and from various sources, references to the field strength produced by a radio transmitting station in volts per metre, in relation to the Immunity Factor of various domestic and consumer products.

"This is an area where there is great risk of misinterpretation, misunderstanding and confusion by many members of the Amateur Radio Service. We, therefore, advise that members of the Amateur Radio Service do no discuss this highly involved and highly controversial subject over-the-air, unless they are absolutely sure of all *the related technical facts . . . If in doubt about any aspect of this complex subject you are advised to contact, for information and advice, the National EMC Advisory Service or, the CASPAR Co-ordinator for clarification of* ANY *(repeat, ANY) aspect of the new Radiocommunications Bill/Act.*

TWO 80 METRE NETS IN VK4

TUESDAY *3.605 MHz 0930 UTC onwards* Queensland Radio Club Net: *This is an official WIAQ Net to enable communications between affiliated Clubs and Council nominee covering WIA matters.* Netcontrol: *VK4AWI.*

THURSDAY *3.605 MHz 0930 UTC onwards* Queensland Net: *This Net, instituted by WIAQ, as a result of the 1978 Radio Club Workshop, is the communications medium between Council and WIAQ members and non-members. It is also a meeting point for amateurs wishing to pursue their hobby of "Shire chasing".* Netcontrols: *VK4QA, VK4BMW, VK4ANU. Note: From October/November to March/April this Net commences 30 minutes later. The time 0930-1000 UTC is 'reserved' for that period for use by the North Qld WICEN Group (Reg 1).* Netcontrol: *VK4WIT.*

AR

EDUCATION NOTES

Brenda Edmonds, VK3KT
FEDERAL EDUCATION OFFICER
56 Baden Powell Drive, Frankston, Vic 3199

This month we publish a sample exam paper for the Amateur Operator's Certificate of Proficiency. This is a typical paper so what about all the Old Timers testing themselves to see how they would fare now, as well as anticipating candidates. Answers appearin this issue after the Hamads.

AOCP EXAM SAMPLE PAPER FEBRUARY 1982

1 Two power amplifier advices are connected in parallel to replace a single device The input impedance will be.—
a doubled
b halved
c reduced slightly
d unchanged

2 An inductance of 3580 microhenries is NOT the same as.—
a 3.58 millihenries
b 3580 x 10 ⁻³ millihenries
c 3.58 x 10 ⁻³ henries
d .000358 henries

3 A cathode ray oscilloscope may be used to show modulation depth by displaying:—
a time on the y axis
b amplitude on the z axis
c a trapezoidal pattern
d the audio frequency input

4 Choke input filters may be used in power supplies because.—
a the ripple frequency is well spaced
b the ripple frequency is doubled but its amplitude halved
c capacitors store too much voltage, leaving less for the output
d they give better regulation than capacitor input filters

5 The formulae for calculation of dB for power and voltage are:—
a $dB = 10 \log \frac{P_1}{P_2}$ and $dB = 100 \log \frac{E_1}{E_2}$
b $dB = 20 \log \frac{P_1}{P_2}$ and $dB = 10 \log \frac{E_1}{E_2}$
c $dB = 10 \log \frac{P_1}{P_2}$ and $dB = 20 \log \frac{E_1}{E_2}$
d both the same

6 Most receiver detectors depend for their functioning on:—
b semi linearity especially for sideband
c non linearity
d frequency stability

7 An antenna tuning unit:—
a tunes the antenna to resonance
b tunes the transmitter
c tunes the coaxial cable to the correct length
d impedance matches the antenna system to the transmitter

8 An LC circuit may be turned electronically by using: —
a a tunnel diode
b a Schottky diode
c a varicap diode
d a dual gate diode

9 Power amplifiers are neutralised by using:—
a negative feedback in phase with the input signal
b positive feedback out of phase with the input signal
c negative feedback from the output
d positive feedback to the input

10 Frequency modulation receivers have limiter stages to:—
a prevent overload of the discriminator
b remove AM interference from the signal
c limit the deviation to within the desired standard
d limit the frequency response to about 3 kHz

11 Amateur stations operating on 1 8 MHz may be heard on broadcast band receivers. This is usually because:—
a amateur signals have a very strong ground wave at 1.8 MHz
b the local oscillators on the broadcast band receivers run at a higher frequency than the broadcast signal
c the subharmonic of 1.8 MHz is in the broadcast band
d most amateur 1.8 MHz transmitters generate their signal at 900 kHz and double to keep away from emergency services

12 Crystals used in overtone oscillators differ from conventional crystals in that they:—
a oscillate at about even harmonics
b are generally used at HF
c are generally less expensive
d are generally cut differently

13 RF probes are used to measure RF voltages in circuits because they —
a are very safe to use
b have little loading effect
c do not absorb power
d operate on DC

14 A single sideband linear amplifier uses two electron tubes in push-pull. The tubes do not require high driving power. They are probably operating:—
a with at least 100 volts bias on one grid
b in class C
c in class AB1
d in class A

15 A tuned circuit tests as being resonant at 7 MHz and 21 MHz. This is:—
a because of the odd harmonic relationship
b because of the poor LC ratio
c possible with a crystal oscillator only
d not possible

16 The voltage across an open circuit cell is 2 volts When it is connected across an 8 ohm resistor, 200 mA flows The internal resistance of the cell is:—
a 8 ohms
b 4 ohms
c 2 ohms
d 1.9 ohms

17 The ripple frequency at the output of a 200 V AC-DC power supply bridge rectifier is:—
a 240 Hz
b 120 Hz
c 100 Hz
d 50 Hz

18 A hot carrier diode has special applications because of its:—
a high reverse resistance
b short transit time
c high heat dissipation ability
d rapid thermal runaway

19 In transistor characteristics 'beta' is:—
a current gain
b power gain
c voltage gain
d input impedance

20 A key click filter is used to:—
a prevent harmonic generation
b prevent modulation splatter
c prevent gaps in the carrier wave
d smooth the rise and fall of the wave form

21 Three wire AC cord is now colour coded active, neutral, earth.—
a brown, blue, yellow-green
b red, black, green
c blue, brown, yellow-green
d red, blue, green

22 The time constant of an inductive circuit is the time in seconds for the current to reach.—
a 63% of its final value
b its final value
c 50% of its final value
d 82% of its final value

23 The frequency applied to a capacitor is doubled. Its reactance is:—
a unchanged
b quadrupled
c halved
d doubled

24 A 9 9 k ohm resistor is placed in series with a 100 ohm 0 1 mA meter The scale will now read:
a 0-1000 volts
b 0-100 volts
c 0-10 volts
d 0-1 volts

25 Coaxial cable is rated at:—
a dB loss per standard length
b dB loss at a given frequency
c dB loss per standard length at a given frequency
d dB loss per standard length at a given frequency and standard temperature

26 A stepdown transformer has an impedance ratio of 64.1. If the input voltage is 120 V AC the output voltage will be about
a 960 volts
b 240 volts
c 15 volts
d 2 volts

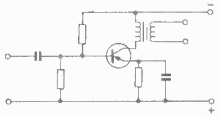
27 Communication on the 146 MHz band over distances of about 500 km may be possible due to:—
a reversed inversions
b a temperature inversion
c katabatic or anabatic temperatures
d the curvature of the earth

28 Bias for automatic gain control is obtained by.—
a rectification of part of the incoming signal
b rectification of part of the BFO output
c using grid or emitter bias at the IF stages
d using a manual RF gain control

29 A dip meter:—
a absorbs power at RF
b is capacitively coupled to an LC circuit to measure its resonant frequency
c is used to measure the resonant frequency of LC circuits accurately
d is inductively coupled to an LC circuit to measure its resonant frequency

30 A 22 V DC source is to be used to provide 10 V regulated using a zener diode. The full load current is 48 mA and the minimum zener current 12 mA The series resistor should be:—
a 560 ohms
b 200 ohms
c 120 ohms
d 20 ohms

31 The transistor configuration used in this amplifer is:—
a common collector
b cathode follower
c transformer bias
d common emitter



32 Parasitics may be prevented by several methods Combinations of methods are designed to—
a prevent UHF oscillation and stop UHF being radiated if it does occur
b ensure that there are no stray input and output resonances at the same frequency, and that feedback paths are blocked
c allow normal HF amplification but prevent unwanted RF from the driver getting into the power amplifier
d keep the drive to the final amplifier as low as possible

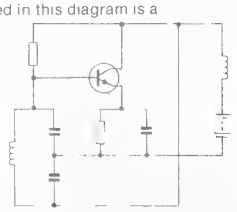
33 The function of the suppressor grid in a pentode may be performed in another electron tube by:—
a gated screen plates

b beam deflecting plates
c a solid screen instead of a screen grid
d beam forming plates

34 MOSFETS and bipolar transistors may be used for similar functions but:—
a MOSFETS usually operate with higher voltages
b bipolar transistors do not have an element equivalent to the source
c MOSFETS cannot operate in a common element configuration
d MOSFETS have a very high input impedance

35 In a 100% modulated AM signal, the power in one sideband:
a is 25% of the power in the carrier
b is 50% of the power in the carrier
c is usually out of phase with the carrier power
d will depend on the efficiency of the sideband filter

36 The oscillator represented in this diagram is a
a Hartley oscillator
b crystal oscillator
c Colpitts oscillator
d Armstrong oscillator



37 The band width of a frequency modulated signal is determined by.—
a the amplitude of the carrier oscillator
b the sideband frequencies with more than 1% of the unmodulated carrier amplitude
c the Q of the tuned circuits in the multiplier stage
d the type of antenna being used

38 The addition of extra director elements to a Yagi antenna should result in
a improved back to front ratio
b a higher input impedance into the driven element
c concentration of the radiated signal into a narrower beam
d a higher SWR reading

39 The term 'pre-emphasis' is used to mean:—
a the high frequencies are attenuated
b both high and low frequencies are accentuated
c an extra audio amplifier stage can be switched in if necessary
d the low frequencies are attenuated

40 A dipole antenna for use on 40 metres would:—
a be 20 metres long overall, and have an input impedance of about 70 ohms
b be 40 metres long overall, and have a current maximum at each end
c have an input impedance of about 300 ohms, and, if horizontal, radiate uniformly in all directions
d have both voltage and current maxima at the centre feed point

41 This filter circuit is a —
a high pass
b low pass
c band stop
d band pass

42 In a double conversion receiver.—
a a high first IF gives good image rejection, and a low second IF gives good selectivity
b a high first IF gives good sensitivity and a low second IF gives good image rejection
c a high first IF gives good selectivity and a low second IF gives good stability
d a high first IF gives good image rejection and a low second IF gives good sensitivity

43 To reduce the possibility of amateur HF transmissions interfering with nearby television reception, use should be made of:—
a a high pass filter at the television receiver and a low pass filter at the HF transmitter
b a low pass filter at the television transmitter and a high pass filter at the HF receiver
c a high pass filter at the HF transmitter and a low pass filter at the television receiver
d band pass filters (low and high) at both receiver and transmitter

44 A device which receives a signal and rebroadcasts it with increased power on a slightly changed frequency is a'—
a radio frequency beacon
b amateur satellite
c repeater
d translator station

45 The direction of polarisation of a radio wave is.—
a parallel to the direction of its electric field
b perpendicular to the direction of the antenna from which it was radiated
c a significant factor in the distance achieved by multiple propagation
d unaffected by refraction in the ionosphere

46 The maximum usable frequency (MUF):—
a drops significantly as the sunspot cycle reaches its peak
b is the highest frequency which is reflected by the ionosphere over a given path
c is constant for any particular path for a particular time of day
d is the highest frequency that can be used for tropospheric ducting

47 In Single Sideband generation the carrier is:—
a suppressed in the filter
b eliminated in the balanced modulator
c reinserted after the filter
d reduced by about 60dB

48 The most important characteristic of a Variable Frequency Oscillator should be
a high sensitivity
b good stability
c broad band width
d high power output

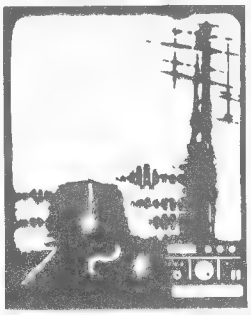
49 The frequencies fed into a mixer stage consist of the output of the local oscillator (1455 kHz) and a carrier at 1000 kHz with sidebands at 1005 and 995 kHz from the RF amplifier. Frequencies present in the output from the mixer stage would include —
a 1900 and 2455 kHz
b 1000, 2455 and 455 kHz
c 2910, 910, and 455 kHz
d 2000, 1995, and 5 kHz

50 The probability of a radio wave being returned to earth by the ionosphere depends on.—
a the degree of ionisation of the E layer only
b the degree of ionisation of the ionosphere, and the virtual height of the F2 layer
c the state of the ionosphere, and the frequency and radiation angle of the wave
d the type and depth of modulation, if any, of the wave

AR

JOIN A NEW MEMBER NOW!

STUDYING FOR THE NOVICE LICENCE?

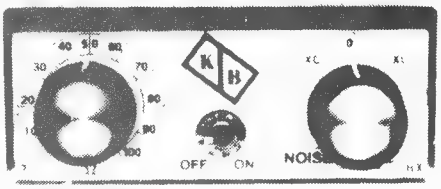


THEORY BOOK:

- contains all nec. theory
- clear diagrams
- simple-to-follow text
- $7.50 inc. postage

MORSE TAPES:

- 5 WPM novice speed
- 8/10/15 WPM practice
- 10 WPM exams
- 15 WPM practice
- $5.00 ea. inc post



NOISE BRIDGE $60 POST PAID

Adjust your antenna for maximum performance. Measure resonant frequency, radiation resistance and reactance. Better than an SWR meter. Operates over 100 MHz. Most useful test unit in your shack

ANTENNA BALUNS $26

3 to 30 MHz
Maximum Power 300 Watts
Centre support
Ideal for Dipoles, Beams, Quads
S0239 connector

POWER LINE FILTER $16

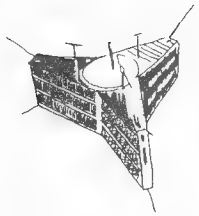
240 Volt @ 10 Amp

1000's of Transistors — Ferrites — Hobby Kits — Tag Strips — Switches etc. Send stamped addressed envelope for full list.

K. BRUCESMITH
110 Rosemead Road
Hornsby N.S.W. 2077

G. SCOTT
11 Balmoral Crescent,
Surry Hills, Melbourne,
Vict. 3127.

welcome here



AMSAT AUSTRALIA

Colin Hurst, VK5HI
8 Arndell Road, Salisbury Park, SA 5109

NATIONAL CO-ORDINATOR
Graham Ratcliff VK5AGR

INFORMATION NETS
AMSAT AUSTRALIA
Control: VK5AGR
Amateur Checkin: 0945 UTC Sunday
Bulletin Commences: 1000 UTC
Winter: 3.680 MHz
Summer: 7.064 MHz

AMSAT PACIFIC
Control: JA1ANG
1100 UTC Sunday
14.305 MHz

AMSAT SW PACIFIC
Control: W6CG
2200 UTC Saturday
28.878 MHz

Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT AUSTRALIA net. This information is also included in some WIA Divisional Broadcasts.

ACKNOWLEDGEMENTS

Contributions this month were received from Bob VK3ZBB and Peter VK7PF. As mentioned last month copy for this month's column was prepared in early November. Thus the content assumes a more academic content in lieu of the normal news and happenings. I trust that you will find the change refreshing.

UOSAT B UPDATE

Progress on this new satellite is continuing at an accelerated pace to meet the February/March 1984 launch schedule. Approval has been granted by NASA for UOSAT-B to go aloft with the LANDSAT-D replacement spacecraft.

ARIANE 4 LAUNCHER

It would appear from reports that proposals have been made on behalf of AMSAT for a launch on a test flight of the ARIANE 4 heavy-lift launcher scheduled in late 1985 or early 1986. A replacement for Oscar 10 is scheduled for that period and an Asteroid Encounter Spacecraft has also been proposed. Initial feasibility studies have been made but detailed design efforts have not been initiated on the asteroid proposal. The satellite would use an ion propulsion system and be fitted with a solar concentrator for power production, thermal control and as a restoring force for an attitude control system. Indeed an interesting proposal.

ALL YOU NEED TO KNOW . . .

The following tutorial was placed on the AMSAT Telemail Bulletin Board in an endeavour to clarify the mystery surrounding the terms applicable to the calculation of orbital parameters for Oscar 10. It is without doubt the most concise explanation that I have read on the subject whilst remaining understandable. I commend it to you.

Satellite Orbital Element Tutorial
Phil Karn, KA9Q
Asst VP, Engineering, AMSAT
1. INTRODUCTION

There are several ways to compute motion of a satellite in a uniform gravitational field. Each involves the solution of three second-order differential equations or their equivalent. This models the gravitational force on the satellite (and therefore the acceleration, the second derivative of position) which is a function of the current position. Integrating acceleration over time gives the change in velocity, and integrating velocity over time gives the change in position. The position change "feeds back" into the process, since as the position changes, the acceleration of gravity changes, and as a result the future velocity and position are affected. You could track a satellite by solving these differential equations brute-force on a computer. To do so, you need to know the "initial conditions", here the starting position and velocity in each of three dimensions, of the satellite at a specified time known as the epoch. These six "constants of integration" are otherwise known as orbital elements. In rectangular (ie XYZ) co-ordinates, this would be the state vector. In other words, if you know where the satellite is and how fast it's moving in a certain direction at a given time, you can predict all future positions and velocities.

2. Two-Body Motion

While this approach is workable, and is often used when forces are present in addition to gravity, eg, kick motor thrust and atmospheric drag, a given position and velocity isn't very descriptive of the size and shape of the orbit. In addition, direct numerical integration on a computer is slow and prone to accumulated errors when carried on for long periods. An alternative, the classical Keplerian element set, transforms the state vector into a different set of six numbers. Orbital prediction based on the Keplerian elements is generally much faster and more accurate than brute-force numerical simulation. However, it must be remembered that it is only well suited for the special case of two body motion where the following assumptions are made:

a The central body (ie, the earth) is massive with respect to the satellite. This is no problem for artificial satellites, but it means that the moon, which is about 1/80th the mass of the earth, requires modifications to the theory.

b The central body is perfectly spherical; the force of gravity at any given point in space around the body points directly at the centre of the body and depends only on the distance from the centre of the body. As we shall see, this is true only to a coarse approximation for the earth.

c No other perturbing forces (other planets, atmospheric drag, rocket thrust) are present.

The path of a satellite in two-body motion follows a conic section: a circle, ellipse, parabola, hyperbola or straight line. Except for the straight line (which is only a theoretical limit case) all of these orbital paths lie in a fixed plane which contains the centre of mass of the central body. The most relevant orbit for out purposes is the ellipse, and the classical Keplerian elements are only properly defined for this case. Since no "real world" orbit is ever PERFECTLY circular, this isn't too serious a restriction. A satellite in elliptical orbit does not stay at a constant distance from the central body; the closest it approaches is called the PERIGEE, and the furthest distance it attains is the APOGEE.

3. The Keplerian Orbital Elements

What follows is a list of the classical Keplerian elements and their definitions.

EPOCH TIME, T: While not strictly an "orbital element", a time reference is needed in any element set to indicate an instant at which the remaining numbers are all valid. This number can be chosen arbitrarily by the individual generating the element set, but it is usually chosen somewhere near the middle of the radar or other observation times which were used to generate the elements.

MEAN MOTION, N: The number of complete orbits the satellite makes in one day. The reciprocal of N is the PERIOD, P, the amount of time required to complete one orbit. Also, once the mean motion is know, a quantity called the SEMI MAJOR AXIS, SMA can be computed. This is defined as one-half the straight line distance between the apsides (ie, the apogee and perigee). Occasionally, the period or SMA will be given in place of the mean motion.

MEAN ANOMALY, M: An indication of where the satellite is along its orbit at the epoch time. Specifically, it is a measure of time since perigee, expressed as an angular quantity with 360 degrees (one full revolution) being equal to one orbital period. For example, a mean anomaly of O says that the satellite is at perigee; a mean anomaly of 90 degrees indicates that the satellite is one quarter period past perigee. Another way of looking at mean anomaly is as the time integral of mean motion. (Equivalently, mean motion is the time derivative of mean anomaly.) Since mean motion is a positive constant (excepting drag effects), mean anomaly increases linearly with time. It must be emphasised that since a satellite in an elliptical orbit does NOT move at a constant rate, the "angle" represented by the mean anomaly does not correspond to any measurable, physical angle. However, knowing the mean anomaly and the eccentricity (described below), you can compute the TRUE ANOMALY, v, which is the angle as seen from the centre of the earth between the

perigee point and the satellite's current position, measured in the direction of satellite motion. Likewise, knowing the true anomaly and the eccentricity, you can compute the mean anomaly.

ECCENTRICITY, e: the degree of "lopsideness" of the orbit. e = 0 would be a perfect circle, 0 < e < 1 is an ellipse, e = 1 is a parabola, and e > 1 is a hyperbola.

Now we have determined the size and shape of the orbit. Next we need to specify how the egg-shaped orbital ellipse is rotated within its orbital plane with respect to an external reference.

ARGUMENT OF PERIGEE, w: the angle, as seen from the centre of the earth and measured in the orbit plane in the direction of motion of the satellite, between the equator and the perigee point. An argument of perigee between 0 and 180 degrees indicates that apogee occurs in the Southern Hemisphere; a value between 180 and 360 degrees represents an apogee in the Northern Hemisphere. Next, the orbital plane must be oriented with respect to an external reference frame. Two numbers are needed to do this.

INCLINATION, i: the angle between the orbit plane and the earth's equator. An inclination of zero means that the satellite is always above the equator; an inclination of 90 degrees indicates that the satellite passes over both poles on each orbit.

RIGHT ASCENSION OF ASCENDING NODE, RAAN or capital-omega: the angle, measured along the equator, between the First Point of Aries (a reference celestial longitude) and the point on the orbit plane where the satellite crosses the equator going northward. The First Point of Aries is defined as the point at which the sun crosses the equator into the Northern Hemisphere at the first instant of Spring. Right ascension is necessary here because it is fixed in space; longitude measurements would depend on the position of the rotating earth.

4. PERTURBATIONS

*If one assumes perfect two-body motion, implying the absence of external perturbations such as the non-spherical shape of the earth, gravitational tugs from the moon and sun, thrust, atmospheric drag, etc, all of the above elements except for mean anomaly would remain constant for all time. Of course, the real world isn't so ideal, but several of these effects are easily compensated for. The most important factor for most satellites is the non-spherical shape of the earth. This causes both short-term and long-term changes in the argument of perigee and right ascension of the ascending node. Additionally, for low altitude satellites, drag can be an appreciable factor. The first factor is easily computed from the other orbital elements; the second can be at best only approximated. The DRAG FACTOR, N-dot/2, indicates the rate of orbital decay by its effect on the mean motion, N. A drag-free orbit has a constant N; atmospheric drag will remove energy from the satellite and increase its mean motion at the rate of 2*N-dot revolutions per day. Of course, as the satellite drops into a lower orbit, atmospheric drag will increase. Therefore predictions based on just a single drag term are at best approximations. Effects of solar and lunar perturbations can usually be ignored for low altitude satellites. More sophisticated models do exist, however, which take into account these effects and they are very useful in the operational planning of geostationary satellites.*

For further reading into the details of orbital mechanics and prediction, I would recommend the following to start: Tom Clark, W3IWI, "Basic Orbits", ORBIT magazine #6. This describes Tom's now-famous orbital prediction programme written in BASIC that has been adapted to many different personal computers.

Bate et al, "Introduction to Astrodynamics", Dover, US$6.50. This excellent paperback is designed for a college level introduction into the subject. Included are sections on orbital element generation which I used in the determination of Oscar-10's orbit after the kick motor burn.

de VK5HI

AR

SATELLITES UP AND DOWN
PERIOD 25TH AUG-22ND SEPT 1983

1. The following satellites were Launched

NUMBER	NAME	NATION	DATE OF LAUNCH	INITIAL DATA				
				PERIOD MINS	APOGEE KM	PERIGEE KM	INCLN DEG	FACILITIES REMARKS
1983-088A	RADUGA 13	USSR	26th Aug	1478	36 617	—	1.3	SC TV
1983-089A	STS 8	USA	30th Aug	90.5	302	296	28.5	*
1983-089B	INSAT 1B	INDIA	31st Aug	—	—	—	—	Deploy from STS 8
1983-090A	MOLNIYA 3	USSR	30th Aug	736	40 815	497	62.8	SC TV
1983-091A	COSMOS 1494	USSR	31st Aug	93.5	561	341	50.7	SI TM
1983-092A	COSMOS 1495	USSR	3rd Sep	88 9	248	211	82.3	SI TM
1983-093A	COSMOS 1496	USSR	7th Sep	89.6	362	182	67 2	SI TM
1983-094A	SATCOM 7	USA	8th Sep	103.5	4000.8	291.3	25.58	SC TM on 2250 5 at 2 5 W
1983-095A	COSMOS 1497	USSR	9th Sep	90 3	403	208	72.8	SI TM
1983-096A	COSMOS 1498	USSR	14th Sep	89 4	305	222	82.3	SI TM
1983-097A	COSMOS 1499	USSR	17th Sep	90.2	396	208	72.9	SI TM
1983-098A	GALAXY 2	USA	22nd Sep	647	36 600	185	23.4	TM on FM 2250 5 at 2.5 W

KEY: SI — Scientific Instruments SC — Satellite Communications
TM — Telemetry TV — Television

** STS 8 crew was R Truly, D Brandenstein, D Gardner, W Thornton, G Bluford. In addition to launching INSAT 1B the crew conducted ten experiments.*

2. The following satellites decayed or were recovered:

1970-099A	COSMOS 379	21st Sep	1983-087A	COSMOS 1493	6th Sep
1982-038A	COSMOS 1355	27th Aug	1983-089A	STS 8	5th Sep
1983-013A	COSMOS 1443	19th Sep	1983-092A	COSMOS 1495	16th Sep
1983-083A	COSMOS 1489	23rd Sep	1983-095A	COSMOS 1497	23rd Sep
1983-085A	Progress 17	18th Sep	1983-097A	COSMOS 1311	28th Aug

Together with forty one other objects

DECEMBER'S BEST PHOTOGRAPHS

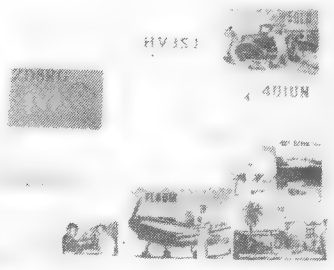
The Judges at AGFA-GEVAERT, Quadricolor Industries and Waverley Offset Printing Group unanimously selected the front cover photo.

This photograph will now be considered for the AGFA camera prize at the end of the competition in June 1984.

For QSL Cards

Phone

(03) 527 7711



Williams Printing Service Pty Ltd

12 William Street,
BALACLAVA 3183

CONTACT US FOR QUOTES

WICEN NEWS

Ron Henderson, VK1RH
FEDERAL WICEN CO-ORDINATOR
171 Kingsford Smith Drive, Melba, ACT 2615

This issue we have a report from Sam Voron VK2BVS on the Simulated Emergency Tests (SET) for 1982 and 1983, together with the VK2 WICEN Exercise Instruction for SET '83 and a preliminary report.

REPORT-SIMULATED EMERGENCY TESTS 1982-1983

COMPILED BY SAM VORON, VK2BVS

Abbreviations
WICEN — Wireless Institute Civil Emergency Network
ATN Australian Traffic Net
STN - Sydney Traffic Net
SET — Simulated Emergency Test
IATN — International Assistance and Traffic Net
NCS National Communications System
ARRL — American Radio Relay League
ABC — Australian Broadcasting Corporation
AAP - Australian Associated Press
CB — Citizens Band Radio

MY OBSERVATIONS OF SET OCTOBER 1982

Operators in Sydney organised a Sydney third party Traffic Network (STN) using 10 metre mobile stations to look at how they could best hand deliver messages in the event of a break down in the local telephone system.

RESULT: 10 AM, 2 PM, 5.45 PM, 11 PM were tried as STN message exchange periods allowing traffic to be exchanged to and from the Australian Traffic Net (ATN) and the International Assistance and Traffic Net (IATN) schedules.

WICEN (Handling agency messages) and ATN (message between individuals in the community) both sent messages of preparedness and capability to the US National Communications System (NCS) demonstrating to US Government authorities reponsible for taking over all remaining communications in a national disaster the international message relaying resources of the amateur radio service.

RESULT: NCS which operates under US Presidential degree signed a memorandum this year with the ARRL as a result of demonstrations such as SET '82.

The WICEN traffic precedence labelled 'test priority' was cleared first, ATN traffic labelled 'test welfare' cleared second — this worked well.

Lack of knowledge of International Communications showed NSW agencies were unaware of whom they would direct requests for overseas assistance since the role assigned to them in a NSW disaster plan could be completely different from the role of their sister body in the USA or Canada.

RESULT: In 1983 SET, NSW WICEN made efforts to match NSW agencies with their closest counterpart in the USA and Canada.

In an emergency ATN activates two additional schedules 0700 UTC (15 metres primary, 20 metres secondary) and 1300 UTC (80 metres primary, 40 metres secondary). These link east, west and northern Australia and were successful in SET '82.

Traffic overload was cleared on all nets except IATN where propagation was limited to two hours daily using 20 m primary. 10 m and 15 m were also used as secondary additional schedule but propogation time to the east coast of USA was similarly limited.

RESULT: See SET '83.

Australian Associated Press (AAP) were given details of SET '82, they contacted press, radio and TV. Details also sent to ABC Radio.

RESULT: Weekend coverage on ABC radio 2BL.

Newcomers (interested non-licensed people) where involved in simulating hand delivery and in filling of messages.

RESULT: Worked Well.

MY OSERVATIONS OF SET SEPTEMBER 1983

The third party traffic scenario for Melbourne was the consequences of a tidal wave hitting the Mornington Peninsula and causing abnormal tidal fluctuations in Victoria's river systems; while Sydney simulated an epidemic situation due to contaminated water supplies.

WICEN in NSW and South Australia sent messages over IATN labelled 'test priority', ATN sent messages labelled 'test welfare'.

RESULT: Worked well.

Overload problem on IATN again this year.

RESULT: The following message was sent to W4PPC Miami, Florida Manager IATN. "SET '83 showed daily propagation time USA Canada to Australia could be 45 minutes or less during 24 hour period suggest IATN prepare for overload in such conditions by members gaining more experience in QSYing — suggest in actual emergency several Australians should be on IATN some to take, others to send traffic. All should be QSYed off 14.303 MHz so all can use available propagation at the same time. Sunspot minimum and the distances apart with effect our international capabilities even further. Summary — IATN an essential link between International traffic and the Australian traffic network. Message of greetings and appreciation from all in Australia to our overseas friends on the IATN." Note that this year 10 m, 15 m, 20 m morning all proved unsuccessful to East Coast USA.

The two additional schedules used during emergencies by the ATN showed the usefulness of the secondary frequency plan due to no propagation on 15 m primary.

CB radio clubs participated in Sydney for the first time looking at the hand delivery of messages to individuals in the community using the ARRL message format on 477 MHz UHF and 27 MHz SSB.

RESULT: With 4 million people in Sydney the potential of CB involvement with amateurs during a disaster in this city is just now being looked at.

In Sydney VK2PJW organising STN scenario introduced many officials to amateur radio by a visit to the NSW State pollution control board, two visits to the NSW Waterboard, eight phone calls to and from the NSW Waterboard and one phone call from the public relations officer NSW Police Department.

Contact made with AAP and local press.

RESULT: Weekend coverage on radio 2CH and local newspapers.

Newcomers (non-licensed interested people) were involved by filling messages and for the first time in actually reading messages on air.

RESULT: Highly successful in taking pressure off the operator. Recommend trained persons as being invaluable in helping under supervision in actual emergency situations.

SET 1982-1983 MY OBSERVATIONS

WICEN and ATN — Operated independent radio networks with independent scenarios. Operated together with IATN. Liason over WICEN repeater and telephone.

THE FUTURE

NSW WICEN — Would like to see more involvement by WICEN in other states in the development of the International Capabilities of the organisation.

ATN — Has seen some amateurs only join in traffic handling in Sydney during SET. Perhaps SET for all amateurs will become what the Rememberance Day Contest is — a once a year event not to be missed — an event to ask questions about how you would provide health and welfare communications to the public in your community during times of need.

SIMULATED EMERGENCY TEST 15th-17th SEPTEMBER, 1983

Compiled by VK2 WICEN

1982 EXPERIENCE

In 1982 WICEN was asked to take part in the Simulated Emergency Test (SET) conducted each year by the American and Canadian amateurs.

The purpose of the SET IS:—

Find out the emergency and third party amateur networks strong points and limitations in providing communications.

Help amateurs gain experience in communicating, using standard procedures under simulated emergency conditions.

Provide a public demonstration — to served agencies such as Red Cross, Salvation Army, etc, and to the news media — of the value to the public of amateur radio, particularly in time of need.

The Federal WICEN Co-ordinator decided to have NSW act as the gateway for International traffic and be the major participants in Australia's first International exercise. Depending upon the result of this exercise other states would be involved in later years.

It was soon realised that the passing of messages between amateurs in Australia and North America at specific times for official agencies was not at all like the contacts that frequently occur on a random casual basis between amateurs.

One of the initial problems encountered included the unexpected fact that Americans have difficulty understanding Australian speech. Another was the realisation that the roles of agencies with the same name could be quite different — not only internationally, but also between the states of Australia.

None of the NSW agencies and experience with international communications exercises of this type and were keen to see the results of the exercise.

Prior to the SET messages explaining the Welfare arrangements in NSW were sent to the US and Canada through the international section of the amateur National Traffic System (NTS).

The NTS was not accustomed to official international traffic and were unable to determine where to deliver our messages. Accordingly we were unable to develop a picture of the overseas welfare systems prior to the weekend set aside for the SET.

Indications were given that approximately 100 agency messages would be passed between Australia and North America. Because of local expectations that this number would not be reached only selected sections of the NSW WICEN network were involved. Contact was maintained with Queensland, Canberra and Melbourne at various times over the weekend.

Ultimately only fifteen messages were passed with the majority being sent from Australia. This could have been due to confusion over who was organising the SET and to lack of participation by the American WICEN counterpart the Amateur Radio Emergency Service (ARES).

1983 EXERCISE

One of the major lessons learnt at the local level was the neglected state of our liaison with the local welfare agencies. Under the New South Wales Welfare Disaster Plan WICENs role is to provide communications assistance to the various non-statutory agencies.

The principle agencies involved are:—

Salvation Army who are responsible for co-ordinating the provision of emergency feeding for disaster victims and rescue workers.

St Vincent de Paul who are responsible for co-ordinating the supply and issue of clothing, toiletries and furniture.

Seventh Day Adventist who are responsible for co-ordinating the provision and allocation of temporary shelter for persons rendered homeless by disasters.

Red Cross who assist in the above functions as well as providing their own specialised services such as blood bank and assistance with missing persons.

Each of these agencies have State and Regional Emergency Liaison Officers.

In addition to the above there has been much discussion on the need to test and exercise all WICEN groups in a statewide operation.

In reviewing our first participation in the SET it was realised that both of the above objectives could be achieved by combining a Welfare Liaison exercise, a Statewide Communications exercise and the international SET.

The need for a National WICEN exercise has also been discussed at various times. Accordingly any State wishing to do so may join in this combined exercise at any level to the degree which best suits them.

New South Wales is to be broken down into regional and local groups for the purpose of the exercise. This means that there will be twenty five stations in the NSW net plus VK2WIA. VK2WIA will not take net control for NSW traffic but will act as a clearing house for any interstate or international traffic.

The Statewide exercise is in two parts.

PART 1: WELFARE LIAISON

Each Regional and Local group is to locate and make contact with the Emergency Liaison Officer/s in their area for the four agencies mentioned above. Units in Sydney should contact their local agencies, not the State Headquarters.

Once contact is made the emergency liaison officer should be informed of the role of WICEN and the services that could be provided in the event of a disaster. Contact arrangements should be made and they should understand the conditions and means of activating WICEN.

Wherever possible two agencies should assist in the generation of a suitable message for Part 2 of the exercise.

PART 2: COMMUNICATIONS EXERCISE

The second part of the exercise involves the passing of messages to other WICEN groups within the state.

The purpose of this exercise is to simulate a communications emergency within the state and to develop techniques for the passing of messages within a reasonable time without having to maintain a listening watch for the whole of the 48 hour period.

To run this exercise (in a small way for the first time) each WICEN group is asked to send messages to two other groups in accordance with the message schedule attached.

The two simulated messages should relate to the welfare function of the agency and if possible they should be involved in its writing. It should be remembered that this is a WICEN exercise and other services may not have the time to participate fully. Comments on the degree of participation will be collected after the exercise.

Stations should use the Regional or Local VK2WI callsign with the area suffix during the exercise. The telephone cannot be used and skeds cannot be arranged before the exercise commences.

PRELIMINARY REPORT

From VK2 WICEN Co-ordinator

To Federal WICEN Co-ordinator

SITREP 180600Z Sept 83 Simulated Emergency Test started 161000Z and due to finish 181100Z. Statewide exercise attracted many early starters. Two messages sent to America 151100Z. VK5WIE joined Exercise at 171330Z. VK3 advised that only able to receive messages due to local exercise. Two messages sent to America on behalf of VK5 and replies to previous messages received 171145Z one forwarded to VK3 180000Z. Local, state, national and international aspects provided valuable experience. Have had good co-operation from Aust Traffic Net. Will supply detailed report after NSW group reports are received.

David Mackay
VK2 WICEN CO-ORDINATOR

COMMENTS BY FEDERAL WICEN CO-ORDINATOR

As noted in the articles above both parties, WICEN and ATN had useful exercises.

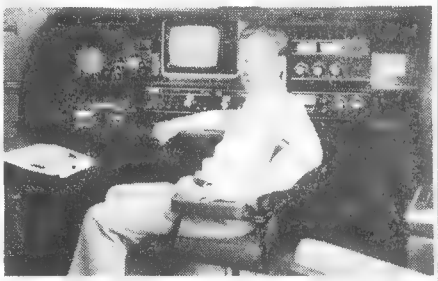
From a WICEN viewpoint we must give some more thought to international emergency communications. WICEN is principally a state based organisation, serving state disaster control agencies but there is a requirement for national communications and also limited international communications to our South East Asian neighbours. I have had requests from the Solomon Islands and Papua New Guinea as to the role, scope and organisation of WICEN indicating awareness of our existance. NDO also see the amateur service as an alerting and early reporting means for information on the onset of natural disasters in our region.

The involvement in a US hookup as occurs in SET is a means of testing our WICEN ability rather than a source of disaster relief. The associated national network adds to our limited opportunities to test these communications. However for ATN and other third party traffic networks their devotion to public welfare emergency traffic places a greater emphasis on their SET involvement. It is pleasing to see that both WICEN and ATN can work and exercise together.

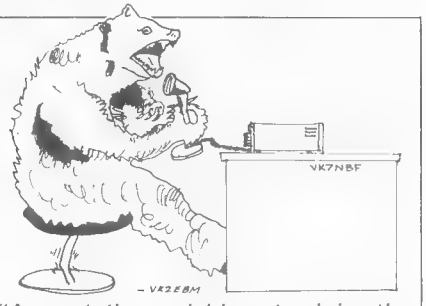
73 Ron VK1RH

AR

CHILD PROOF SHACK



Ian VK3ST, author of "Russian Speaking for Amateurs" (see p 30 Dec issue) prepares for another QSO to UA—land. Ian is seated at his custom built roll top, lockable child proof shack.



"Any station wishing to join the Tasmanian Devil Award Net please call VK7NBF!"

AWARDS

Mike Bazely, VK6HD
FEDERAL CONTEST MANAGER
8 James Road, Kalamunda, WA 6076

Happy New Year!!! I trust that those wanted ones for whichever certificate you are chasing fall into your net in 1984. At the time of writing this column (5th November), there is still no news on the DXCC status of KL7 Priboloffs or KH5 Jarvis. QSLs presently being accepted for DXCC credit are those from XU1KC and XU1SS.

VK2EBX has kindly forwarded details of the Yeovil Amateur Radio Award which is available to both transmitting and SWL stations. The rules are as follows:

1 *To work or hear any 22 British Stations with the last letter of the call to make up the words "Yeovil Amateur Radio Club". For example:— G3--Y, GM2--E, etc, etc. They can be G, GD, GI, GJ, GM, GU, GW or GB special calls.*
2 *Valid contacts from 1st July, 1983 to count; any band, any mode.*
3 *No QSLs to be sent, only a certified list of QSOs (Copy of Logs) signed by an Official Radio Club or by two active amateurs.*
4 *This Award is open to all amateurs or SWLs in any country.*
5 *A total of 22 QSOs are required and consist of:—*
3 ending in A 2 ending in I 1 ending in T
1 ending in B 2 ending in L 2 ending in U
1 ending in C 1 ending in M 1 ending in V
1 ending in D 2 ending in O 1 ending in Y
2 ending in E 2 ending in R
6 *Send Certified List together with 10 IRCs, US $2 or UK £1. To:— Awards Manager, F W Parkhurst, 56 Cromwell Road, Yeovil. Somerset, England. BA21 5AW.*

CERTIFICATE HUNTERS CLUB

Several awards are sponsored by Chapter No 3 of the New Zealand Certificate Hunters Club. Anyone who is interested may obtain details from E P Tombs, ZL2IG, Ihakara, RDI, Levin, New Zealand. Do not forget to include return postage.

Another privately sponsored award programme is run by the "Diploma Interests Group". They have a comprehensive award programme between members and other interested amateurs. Details of membership etc may be obtained from:— Eberhard Warnecke, DJ8OT, Postfach 10 12 44, 5620 Velbert 1, West Germany.

Awards issued and DXCC amendments up to the 1st November are listed below.

DXCC NEW MEMBERS

PHONE

Callsign	Cert No	Tally
VK2VUB	320	108
G3NBC	321	140
VK2AHD	322	102

OPEN

WB3CQN	221	288/291
VK3DFI	222	103/104

DXCC AMENDMENTS

PHONE

VK2AHH	281/308	VK4RF	306/319
VK3GI	203/205	VK4VC	308/322
VK3JF	306/321	VK6MK	313/353
VK3XB	299/330	VK6AJW	274/276
VK3BDL	214/218	VK7BC	283/288
VK3DXY	252/253		

CW

VK2QL	310/353	VK3YL	305/338
VK2AHH	135/149	VK4RF	286/310
VK3JF	228/245	VK6FS	132/135
VK3KS	269/290	VK7BC	156/171
VK3XB	294/325		

RTTY

VK2SG	148/149

OPEN

VK2AHH	287/317	VK5GZ	124
VK2VBL	202	VK6MK	313/353
VK3DS	222/228	VK7BC	299/330
VK3JF	309/333	WA3HUP	311/330
VK3YL	314/353	WB3CQN	291/294
VK4RF	309/339		

WAVKCA AWARD

Callsign	Cert No	Callsign	Cert No
KL7AF	1176	K2SHZ	1185
JR6LLN	1177	JA1VDJ	1186
KB3OM	1178	OK2BJR	1187
JA4IKD	1179	W3YFI	1188
I8WY	1180	JE2KEB	1189
I5ZJK	1181	JR1TXR	1190
I2WZX	1182	JA0CIU	1191
OK1ABP	1183	VK2AHD	1192
JT1BG	1184	JA5NSR	1193

WAVKCA AWARD (VHF)

VK2VC 17

SPECIAL HAMELIN AWARD

From Horst DJ6WX via John VK3WZ comes the news that the Amateur Radio Club of Hamelin will have a special award in 1984 to help the town of Hamelin celebrate the 700th anniversary of the story "The Pied Piper of Hamlin".

Rules: All DX stations need three points. All stations from Hamelin count as one point and the club station, DK0HM counts as two points. Contacts made between 1st January to 31st December, 1984 are valid for the award. Send a log extract together with 7 IRCs to DG7OX, Hanna Knickmeyer, Fischbecker Str 58, 3250 Hamelin 1.

There will also be a special award for collecting the three points during Jubilee Week, 22nd June to 1st July.

AR

PLEASE NOTE:

Due to early deadlines for this month's issue there are no Ionospheric Predictions. However they will return in February issue.

FORWARD BIAS

VK1 DIVISION

John MacPhee, VK1NEN
PUBLICITY OFFICER,
EDUCATION OFFICER AND
FORWARD BIAS EDITOR
36 Kavel Street, Torrens, ACT 2607

"Happy New Year" to all readers.

A new year always brings with it a host of ideas for the future. It might be building that new antenna so that you can win more competitions, or hunt that elusive 100th country for the "DXCC", whatever the reason we all know that you have to start somewhere, and that brings me to the start of this article.

HOW TO BECOME AN AMATEUR RADIO OPERATOR

The VK1 Division of the WIA holds lecture classes each year for those people wishing to become amateurs, or those operators wanting to up-grade to a higher class of licence. There are two courses available. The Novice (NAOCP) and the Full call (AOCP).

NOVICE CLASSES

These will begin on Tuesday, 31st January and will conclude on Tuesday, 13th November, 1984. The fee for this course will be approx $30.00 per student, this also includes study material. This course provides basic electronic theory and Morse code practise at 5 WPM. This course constitutes the ground work for a beginner to enter the fascinating world of amateur radio.

FULL CALL CLASSES

These classes will commence 2nd February and will conclude on the 9th August, 1984. Course fee will be approx $30.00. This course is suited to the holder of a Novice Licence or the person that has knowledge in electronics and wishes to gain some information on the finer points of radio theory, propagation, antennas and circuit analysis etc for the purpose of gaining an amateur radio licence. This course also provides tutoring in Morse code at 10 WPM.

Those people wanting to enroll in either of the 1984 courses can contact myself on phone 86 3290 at home, or at work on 81 5455. Please contact me or one of the committee as soon as possible. This will help us with organising course material and a suitably sized lecture room.

1984 ANNUAL GENERAL MEETING

In accordance with the Division's Constitution, notice is hereby given that the AGM will be held on Monday, 27th February, 1984 at 8 PM at the Griffen Centre, Civic, and all are welcome to attend.

The order of business will be as follows:

- *to receive from the Committee, Auditor, Federal Councillor, Public Officer and other officers, reports on the Division's transactions and business during 1983;*
- *to elect the officers and committee members for 1984;*
- *to elect the Federal Councillor; and*
- *to appoint the Auditor and determine his remuneration, if any.*

Nominations of candidates for election of officers of the division or as committee members must be in writing, signed by two members of the division, who are holders of a current Australian transmitting licence, and accompanied by the written consent of the candidate. The nomination is to be delivered to the Public Officer at least ten days prior to the date of the AGM. Nomination forms will be available at January's general meeting.

So, let's see heaps of nominations arrive, and don't leave it to "Someone Else" because he died a long time ago.

MEETING DATES

23rd Jan, 27th Feb, 26th Mar, 16th Apr, 28th May, 25th June, 23rd July, 27th Aug, 24th Sept, 22nd Oct, 26th Nov.

All of the above meetings will be held at the Griffen Centre, Civic, all being well.

Till next month 73.

AR

SHURE
MODEL 444-D
DUAL IMPEDANCE
CONTROLLED MAGNETIC®
COMMUNICATIONS
MICROPHONE

GENERAL. The Model 444-D is a pressure-operated CONTROLLED MAGNETIC microphone. It is specifically designed for radio communication applications and provides optimum performance from single sideband transmitters as well as AM and FM units. The response cuts off sharply below 300 and above 3000 Hz, with a rising characteristic to 3000 Hz. This special response characteristic results in optimum speech intelligibility and audio punch to cut through noise and interference.

MICROPHONE FEATURES • A response tailored for single sideband transmissions • A switch for instantaneous selection of Press-To-Talk or VOX (voice-operated relay control) operation • Finger-tip control bar (locking or non-locking action) to actuate microphone and an external relay or control circuit • Long-life switch to satisfy severe requirement of communication systems • Adjustable microphone height • A sturdy, high impact ARMO-DUR™ base and microphone case • Dependability — under all operating conditions.

The "**SHURE**" **MODEL 444** has one of the best "sounds" on the amateur bands.

IT'S THE BASE STATION
MICROPHONE FOR YOUR STATION

Price: $145 (inc post)

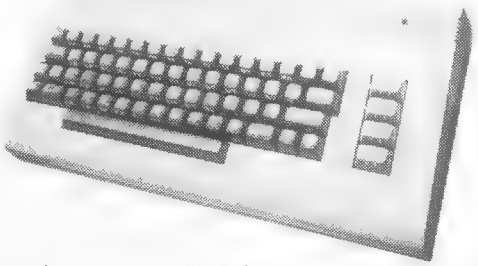
William Willis & Co Pty Ltd
98 Canterbury Road, Canterbury, Vic 3126
PHONE: 836 0707.

ASCII BAUDOT CW SSTV

Why be locked in with an expensive dedicated communications terminal? The COMMODORE 64 or VIC-20, with our software, offers advanced ASCII, BAUDOT AND CW operation (plus SSTV keyboard on the C64) on two of the world's most popular fully programmable home computers.

VIC-20 computer –5K RAM, 8 colours, hi-res 176*200 pixel graphics, 4 voice sound generator $295.

Commodore 64 computer–64K RAM, 16 colours, hi-res 320*200 pixel graphics, sprites, sound synthesizer $499.



Both computers feature 20K BASIC and operating system, RS-232, serial IEEE-488 and parallel ports, video to standard TV or direct to monitor – disk and tape drives, printers, modems, light pens, etc. available plus hundreds of programmes for home and business – games, utilities, word processors, databases, home finance, education.

HIGH TECHNOLOGY
COMPUTER SYSTEMS PTY. LTD.

87 SWAN STREET, RICHMOND VIC., 3121
TELEPHONE: (03) 429 1966

VK2 MINI BULLETIN

Jeff Pages, VK2BYY
VK2 MINI BULLETIN EDITOR
PO Box 1066, Parramatta, NSW 2150

COUNCIL REPORT

Divisional Council met at Amateur Radio House on the 11th November, 1983. Fifteen applications for membership were accepted. Assistant Treasurer Susan Brown reported that negotiations with the Metropolitan Water, Sewerage and Drainage Board for a concession on the water rates for Amateur Radio House were successful. Council resolved to support a proposal from the Federal Executive for uniform membership rates for overseas members. An application from the Taree Amateur Radio Club for a 70 cm repeater, VK2REE, to operate on channel 8325, was approved for submission to the Department of Communications.

Council discussed letters and other feedback from members regarding the recently reactivated relays of Divisional broadcasts on to CBRS frequencies. These relays were originally approved in 1977 by the Division and the Department of Communications, and both the Department and Council reaffirmed this position when a member sought to resume this service, subject to the conditions adopted in 1977. Council believes that such relays provide a good opportunity to publicise the existence of the Amateur Service, the WIA and radio clubs to potential amateurs, however as this appears to be a contentious issue Council decided to raise the matter at the Annual General Meeting so that all members may have the opportunity to express their opinions and vote on this subject.

Affiliated Clubs Officer Jeff Pages VK2BYY presented a report on the Ninth Conference of Clubs, at which nine affiliated clubs were represented. A report will be given in this column once the official minutes of the Conference have been received. Council adopted the recommendation from the Conference that the Division's video tape library be open to individual members as well as affiliated clubs. Any enquiries regarding tapes should be made to the Divisional Office. Members are reminded that the Federal Video Tape Co-ordinator also provides a service whereby copies of those tapes not subject to copyright may be dubbed onto video cassettes supplied by members (see September 1983 AR for details).

ANNUAL GENERAL MEETING

Members are reminded that the Annual General Meeting of the Wireless Institute of Australia NSW Division will be held on the 31st March at 2.00 PM at the Granville RSL Club. Agenda items and nominations for Council must be received at the Divisional Office no later than the 29th February. This meeting provides an opportunity for all members to discuss and vote on matters pertaining to this Division. If there is any subject you would like discussed please forward an agenda item, even if you will be unable to personally attend the meeting.

Nominations for Divisional Council are also required. Council is responsible for the management of the Division, and each councillor is required to attend a monthly council meeting as well as carry out certain duties depending upon the positions held. If you would like to become involved in the administration of your hobby you may obtain a nomination form from the office. Don't leave it to the other guy — he has probably left it to you!

SUBSCRIPTIONS

All of you should by now have received a Christmas present from the Federal Office in the form of a renewal office. Please assist by paying promptly. Remember that payments must go to the Federal Office (NOT the Divisional Office). If you have any queries about your renewal or membership status contact the Divisional Office.

AFFILIATED CLUBS

ARMIDALE & DISTRICT
AMATEUR RADIO CLUB

Address: C/- Kevin Meredith, Lot 20, Chessington Est, Ivergowrie, 2350

Club Callsign: VK2DGZ

Meetings: 7.30 PM tri-monthly at the Organic Chemistry Building, University of New England, Armidale.

Nets: 21.165 MHz each Thursday at 8.00 PM, 3.588 MHz daily.

Committee:
President — Gordon Smith VK2DJG
Vice President — Phill Beard VK2VBM/XPB
Secretary — Kevin Meredith VK2VCB

Club Newsletter — Tri-monthly

MID SOUTH COAST
AMATEUR RADIO CLUB

Address: PO Box 7, Milton, NSW 2538

Meetings: Quarterly as announced.

Nets: Repeater 6700 at 2030 hours and on 3.650 MHz at 2000 hours each Wednesday.

Committee:
President — J Telfer
Vice President — H Knott
Secretary — J Yalden

Club Newsletter — Lyrebird published quarterly.

Repeater — VK2RMU Channel 6700

73 from Jeff VK2BYY
VK2 Mini Bulletin Editor
AR

FIVE-EIGHTH WAVE

Jennifer Warrington, VK5ANW
59 Albert Street, Clarence Gardens, SA 5039

This year we have been most fortunate with the opportunities that we have been given for public relations exercises. We had the station at the GPO in May for ITU day, and the following three! Admittedly we went looking for a suitable venue but were welcomed with open arms once the suggestion was made. In October we were invited to participate in a Science Fair which was held in a local shopping Mall, West Lakes, in conjunction with the Education Department.

The theme this year was Communications, and the main area was given over to all sorts of science experiments, suitable for Primary school children, all involving communications. Not only were we on view to the public but at twenty minute intervals groups of school children from the primary schools in the area arrived and were let loose, with supervision, to try out the various experiments. With operators on 2 metres, 70 centimetres, and various HF bands there were plenty of opportunities to talk on the air, or to watch Lindsay VK5GZ sending CW. Conditions on 20 metres were not good and although they were most impressed when I worked a couple of ZL stations their untrained ears found it hard to understand SSB. They were much happier when I invited them to talk to some of the 'locals' and I was deeply grateful to Don VK5ADC, Reg VK5NQ, and Eddie VK5ARL, amongst others, whose patience and perserverence had to be heard to be believed. I'm still not sure who had the most fun, I certainly enjoyed it and was nearly hoarse by the end of the day. Just before 3 PM I worked Peter, VK0ST, at Casey Base with a beautifully clear 5/7 signal and none of the usual multi-path echo generally associated with working the Antarctic. As well as infecting the children and teachers, with enthusiasm, I discovered that the man who was responsible for organising the whole thing had once been an enthusiastic SWL, and as he said, seeing us operating had re-kindled the flame, so hopefully we will have a new amateur in our midst shortly.

I admit I was surprised by some of the questions that the children asked. They seemed to find it hard to comprehend that the man, or lady, as we also worked Margaret VK2AHD, was sitting at home talking to us, they seemed to think that they should have been in a plane, boat, taxi, etc. Questions like 'can I talk to my sister in Yugoslavia' 'can I talk to America' 'can you listen to the police' and enquiries as to whether I could receive CB or the local commercial stations, all took some explaining! The station was manned during shopping hours from Monday 24th October to Friday 28th and our thanks must go to all those who volunteered. Special thanks to Roland VK5OU who organised it for the Division.

DIARY DATES

24th January will be a buy and sell — NOT the 31st. **AR**

VK3 WIA NOTES

Compiled by:
Ian Palmer, VK3YIP, SECRETARY
Jim Linton, VK3PR, PRESIDENT

The Victorian Division has introduced a new scheme where current and prospective members can make a once-only payment to be a financial member for life. The once-only payment is based on a formula which includes the annual Full-member subscription rate, at the time of application, multiplied by a factor of 15. However, in the case of members eligible for the Pensioner rate, this multiplication factor is 12. Should a member under this scheme move interstate, the Victorian Division would continue to pay that member's subscription levied by that Division.

As an example, in the case of someone eligible for the Pensioner rate this once-only payment would be $420.00 ($35 x 12), while all other membership grades would pay $525.00 ($35 x 15).

Already the Division has two people who have taken advantage of this scheme and the Victorian Divisional Council hopes more members will find this scheme attractive. Further details may be obtained by writing to: The Secretary, WIA Victorian Division, 412 Brunswick Street, Fitzroy, Vic 3065.

MAGAZINE PR

A colourful and informative article on our hobby appeared in the 29 October edition of New Idea magazine.

The full page feature entitled "Hamming It Up On The Airwaves" discussed women and amateur radio and included some basic information on the requirements for the Novice licence.

Three "Full Call Girls" as they're described in the article, Margaret Loft VK3DML, Kim Wilson VK3CYL and Mavis Stafford VK3KS, were interviewed in Mavis' and Ivor's shack by journalist Jo Wiles.

WIA Public Relations Officer, Jim Linton VK3PC had put Jo in contact with Margaret after interesting her in writing an article and providing written background material on amateur radio.

Margaret, ALARA Vice President and WIA Midland Zone Secretary said the response from the article had been excellent.

Apart from the absorbing style in which it was written it advised readers wanting further information to contact ALARA via PO Box 4, Brighton, Vic 3186, or the Wireless Institute of Australia.

In the first week after it was published ALARA received fifteen letters.

These were mainly from women who were not aware that they could be involved in the hobby and wanting to know how to get their own licence.

If you're trying to encourage a YL or XYL to take up the hobby — show them the New Idea article.

WICEN STEERING COMMITTEE FORMED

The future direction and structure of WICEN in Victoria is now being considered by a steering committee of people who want to see WICEN more prepared to play its role in disasters.

Photograph courtesy Mark Smith, New Idea Magazine

L to R: Kim VK3CYL, Margaret VK3DML and Mavis VK3KS seated whilst being interviewed for New Idea.

Considerable work on reviewing WICEN has been done since late 1982 by Alan Noble VK3BBM, and he has joined the thirteen member committee as a co-opted person.

State WICEN co-ordinator Peter Mitchell VK3ANX has told the WIA Victorian Divisional Council that he wants to retire from the position, but he will remain until a replacement is found and to assist the committee.

A number of things are being considered by the steering committee which were raised at an open meeting of those interested in WICEN which was held in Melbourne on 12th November, 1983.

About fifty attended the meeting including zone and club delegates, and the meeting adopted the idea that there should be an annual WICEN meeting as part of the state-wide structure.

Among the things being examined by the steering committee are the formal structure of WICEN, official recognition by authorities and government, a training manual and the training of operators.

The meeting directed the steering committee to complete its work by the end of March and then report its findings.

A MEMBERSHIP RECRUITING DRIVE

A concerted membership drive is being held VK3 during 1984 under the title of "CAMPAIGN 3000" which has the aim of breaking the 3000 member barrier.

The Victorian Division can be proud of its high membership record. More than 2600 is the level of membership at present and the number is growing at a healthy rate.

Zones, clubs and individuals will be asked to assist with "CAMPAIGN 3000" to ensure our division remains on top of the membership ladder.

It shouldn't be too hard to recruit new members and get those unfinancial members to pay their subs — look at the services provided by VK3 and its active role in Institute affairs and you'll agree membership is value for money.

AR

QSP

SOFTWARE ERROR SANK THE SHEFFIELD

HMS Sheffield, the first and most devastating British naval loss of the Falklands War, was hit by an Argentinian Exocet missile because the ship's computer was programmed to recognise the Exocet as friendly. Immediately after the sinking, all computers aboard the rest of the task force in the South Atlantic were reprogrammed to correct the error.

From ZS6TJ Calling in Collector-Emitter, Sept 1983

AR

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

REMEMBERANCE DAY CONTEST

Please permit me to make some comments about the Remembrance Day Contest and its rules.

The rules provide for operation on all bands except 10 MHz. The newer WARC bands 18 and 24 MHz have not been excluded. Given the nature of the bands it seems reasonable to exclude them from contests, but in either case it should be stated clearly.

According to the rules, logs must be submitted in the format shown No format was shown.

The above are fairly picky criticisms, but it occurred to me that if I can demonstrate a need for new immediately necessary rule changes, then it becomes easier to contemplate a thorough review of the spirit and rules of the Remembrance Day Contest, once known as "the friendly contest".

Under the heading of general review, may I ask that the following suggestion be given serious consideration before the 1984 RD:

Limit contacts to once per band per mode on all bands, or twice if twelve hours have elapsed.

Allow one point for phone contacts and two points for narrow-mode contacts within one's own call area.

Allow two points for phone contacts and four points for narrow-mode contacts outside one's own call area.

As in the John Moyle, allow a point for contacting a station outside VK, ZL and P29.

Reserve some small portion of each band for those not involved in the contest.

I would be absolutely delighted if these changes were adopted for the next RD, and many other operators with whom I've discussed the subject would be equally pleased. I would also be amazed! Seriously, let's get some general discussion going with a view to revising the rules to suit current conditions and attitudes — the result will be a "friendly" contest which more people will find more rewarding.

Marshall Emm, VK5FN
Box 389, GPO
Adelaide, SA 5001

Ed Note: This letter has been shortened. In view of the interest in Contest Rules correspondents should keep their letters short.

AR

ATV REPEATER

Melbourne is indeed very fortunate to be served by such an excellent ATV repeater together with a most capable and professional service team. However, unfortunately the same cannot be said of the operating standards of those using this excellent facility.

Surely one of the main advantages of having an ATV repeater which is capable of being received on regular TV receivers is in the publicity potential for ATV and the Amateur Radio Service in general. This repeater allows easy access to our hobby by the general public as well as those of us who do not fully participate in ATV. Therefore, those using this repeater should ensure that their transmissions are also of a high technical standard ensuring that the repeater's output signal presents a good quality picture on regular TV receivers. Correct sync and video levels, at least . . . not, for example, the "burning" colours and the picture tear at the top of the screen.

Further more, the operating standard leaves a lot to be desired at times. These poor standards include such things as — picture with sound only on 2 metres or some other band, poor camera technique leaving at times rubbish or blank screens etc, etc.

It seems, like VK5, we need an in-band ATV repeater in addition to 50 cm. This would keep some of the mess off the channel receivable on regular TV sets.

The tremendous potential of this very accessable repeater could be fully realised given some positive planning and organisation by the ATV community and other interested parties. Let's not sell ourselves short on this super mode and, most of all let's not give the authorities any excuse to remove this allocation from the Amateur Service.

Yours sincerely
Tony Tregale, VK3QQ
38 Wattle Drive
Watsonia, Vic 3087

AR

FOLLOW-UP TO CUBICAL QUAD

Thanks for publishing my article on the Cubical Quad Antenna, Page 21 — November 1983, however after receiving letters requesting more information and a request from William Willis & Co to advise readers of the coil type number to avoid further queries, I would be grateful if you could print the following information

The coil is a type 4-08 being 1" (25 mm) in diameter, 8 turns per inch (25 mm) and 3" (75 mm) long from which they prune 4½ turns for 10 metres, 5 turns for 15 metres and 6½ turns for 20 metres, leaving approx 8 turns to allow for connecting pigtails. Therefore only one coil is required — price $2.60. The turns are held at a fixed pitch on the form so should remain rigid around the insulator after soldering of the pigtails. The quad should have sufficient bandwidth to cover most of the three bands so there is no need to tune for a specific section of a band. Scalar in Victoria advise that the spider hubs are at present out of stock but have ordered more from the USA and hope to have them available soon. Current price of the hubs is unknown.

Thank you for your patience,
73
Peter Hewitson, VK8PH
17 Mackillop Street,
Parap, Darwin, NT 5790

AR

STUPID OR IGNORANT

There seems to be a growing tendency, among so called experts, to find a great amount of humour in, the mistakes made by those who have little or no knowledge in their particular speciality. Little people need big pedestals and no doubt get a sense of superiority by making fun of others. But if, for instance, a CBer asks if a five amp fuse, in place of a two amp one will give his transmitter more power, I see nothing to laugh at but instead I see a challenge to try to give him a clear idea of just what fuses do. Incidentally, the lower resistance of the heavier fuse might give a microscopic increase in voltage and power — if one wants to split hairs! Likewise with people who want to take their telephone to the new house, or even take it with them in their car.

Such people are ignorant but not necessarily stupid. A baby just learning to talk is very ignorant but it is highly intelligent, its capacity to learn is far greater than that of most adults. On the other hand a so called expert with a string of letters after his name who thinks he knows everything, is neither ignorant nor intelligent. He is just plain stupid.

It is these people who in my book are fair game for satire and criticism. Nobody can avoid making mistakes but the least that could be expected is an honest admission and apology when the inevitable does happen. Stupidity of course is not confined to the experts. The person who blindly gets into a modern transceiver with a screwdriver and then complains that it "won't work" is equally stupid. If however he does it and accepts the result as the price one has to pay for education that is another matter.

There is a piece of verse, derived from one of Rudyard Kipling's books, which goes —

"The little fox was born in May, the Rains came in September.

"Such dreadful storms as these" said he, "I really can't remember".

In the light of total knowledge we are all "very little foxes" indeed. We can't avoid being ignorant. It's not our fault if we're not particularly intelligent. But at least we don't have to be stupid!

Roy Hartkopf, VK3AOH
34 Toolangi Road
Alphington, Vic 3078

AR

THANK YOU

On behalf of all members of the Girl Guide Association of Australia I wish to thank all members of your Institute who assisted in this years Jamboree On The Air.

The time and effort put into this annual International event by Amateur Radio Operators is very much appreciated.

Yours faithfully
Mrs W P (Irene) Daniel
Australian Guide Liaison JOTA
4 Cypress Drive
Cypress Gardens, 4217

AR

QRPp CLUB

Since April of this year I have been unable to find any spare time for amateur radio due to an excess workload at my place of employment and there is no possibility in the foreseeable future that this situation will ease.

I regret to inform you that, as a consequence, I have had to fold-up the VK CW QRPp CLUB and this organisation is therefore defunct as from 17th October, 1983.

In addition, I am forced to resign from my office as the Secretary of the WORLD QRP FEDERATION as from 22nd October, 1983 and have requested Colin Turner, G3VTT, to act as Interim Secretary. His address is: 'Hurley', Weavering Street, Maidstone, Kent ME14 5JJ, United Kingdom. All correspondence relating to WQF matters should now be forwarded to him.

Naturally I am very sad that this unfortunate turn of events has placed me in this embarrassing position and I humbly apologise to all concerned for any inconvenience.

My best 73s and sincere regrets.

Jack Swiney, VK6JS
59 Collova Way
Wattleup, WA 6166

AR

DISAPPOINTED AWARD HUNTER

It makes me very unhappy to have to write this letter, but I can see no other way to approach the problem.

On the 23rd May, last, I sent an award claim to an award manager in VK8, to claim the VK8 Award. On the same day, I sent other award claims to Japan and New Zealand. The Japanese and New Zealand Awards were returned to me within three weeks, and I am still awaiting the arrival of the VK8 Award. Thinking perhaps that the claim may not have been received by the Award Custodian in VK8, I wrote to him on the 25th August, last, and have received no reply (as at 20th October).

My object in writing this letter is to try and draw the attention of the Award Custodian to the delay, or, if the award no longer exists, to ask the Custodian, through the columns of AR, to return the claim and cost of the award to me, and perhaps let the amateur population know that the award is now defunct, if this is the case.

This is very disappointing, and I will be very interested to find out why such a simple exercise has been met with such frustration.

Vy 73

Bill Martin, VK2EBM
33 Somerville Road
Hornsby Heights, NSW 2077
AR

REMINISCING FIFTY YEARS

Quite enjoyed the Vol 51, Golden Jubilee Issue, this is also my anniversary of fifty years in amateur radio.

I was the second licenced amateur in Naracoorte SA. The first amateur was E T J Kirby VK5EJ and the third amateur was Walter P Burford VK5PB. The first valve I ever had was a D2. It was round like an ornamental light globe and lit up like one. The plate was a ¾" tube about the size of a lead pencil and a spiral filament ran through the centre.

Things have changed a lot but it was really interesting when you had to make up your own gear. I had a PCJ 4 receiver and later a Paris 2, before super hets were in Vogue. One of my transmitters was a TNT oscillator with an E406 valve. Later on when we got DC current in the town I used a number of Osram AC/DC pentodes in series filament for oscillator, buffer and pushpull final.

The modulator used the same tubes, connected as triode for speech amp, pentode for driver and two more in pushpull. I have had many other rigs in between and now have an Icom 22S for 2 metres, Yaesu FT200 and a copy of the Swan 240. Antennas have mostly been single wire matched impedance Windom, G5RV and the only one I have at the moment is a Joystick multiband centre loaded whip, ten metres up.

One could write for hours but I don't wish to bore. I don't operate a lot but do like to talk to some of the old and new mates occasionally. Some of the novices are really cluey boys. Although I'll be 72 in January I still do a lot of work which keeps me busy and fit by the Grace of the Great Architect. I can hold my own still on a house-wiring job but I'm not really keen on ceiling work now.

My badge is one of the real old ones.

Congrats on the fine presentation of AR.

Yours fraternally

Campbell Patterson, VK5XR
22 Pine Street
Peterborough, SA 5422
AR

Obituaries

GEORGE ALFRED CAMPBELL VK4GC

George, formerly of Brook Street, Highgate Hill and lately of Mermaid Beach, was an early pioneer of wireless and amateur radio in Brisbane. He passed away at Mt Olivet Hospital on 9th November, 1983.

OOT George, who was in his 90th year when he became an SK, never confided in this writer just when and how he first became interested in WIRELESS — but it was almost certainly in the early 1920s. He was an active amateur in the late 1930s when I had the pleasure of meeting him and his family. Like all early pioneers VK4GC did more than his share of homebrewing. I remember distinctly the top quality of his AM transmissions. On display in his shack was a variety of early pieces of equipment. His interests were varied; he not only worked his share of DX, he also kept regular ragchewing skeds for many years.

George VK4GC is survived by two daughters and one son. He had the great satisfaction denied to many of knowing the amateur tradition in his family would be carried on. Son, George Jnr has the call VK4GV and elder daughter Dorothy did her bit by marrying Jim Ramage, VK2HK of Hornsby, NSW.

May I, together with all those who knew George VK4GC in the 1930s, offer my condolences to his surviving family, Dorothy, Thelma (Bunty) and George Junior.

Alan Shawsmith, VK4SS
AR

MAC McCARTER VK5AMN

"Lieut Colonel Lewis C McCarter, "B" Company, 2/43rd Battalion passed away on Saturday, 22nd October at Daws Road Repatriation Hospital at the age of 72."

To many amateurs this annoucement would mean little, but if it were reworded to read, "'Mac', VK5AMN, became a silent key", I am sure that it would stir many memories of "Mac, the Brass Pounder".

Mac obtained his Novice Call about seven years ago, and shortly thereafter upgraded to a Full-Call. He was an ardent homebrewer and was never happier than when he was out in his well appointed workshop and radio shack tinkering with some project.

His 2 element quad and dipole enabled him to make many friends in many countries around the world, until July 1983 when he was hospitalised; since then he was heard signing "portable Daws Road" on the local 2 metre repeater.

Mac's medical problems were many, and at times he was not able to operate because of them, but, rather incredibly, in the next bed was another amateur who was able to report on Mac's condition to his many "on air" friends. Mac received a lot of encouragement via the repeater and there is no doubt that he enjoyed the many contacts he made.

Apart from amateur radio, Mac was admired by the men that he led in Tobruk where he won the Military Cross for bravery — he was twice wounded, campaigned again at El Alamein, was captured by Rommel's forces, escaped, was recaptured, and spent the last part of the war in a German Stalag.

Since then he has maintained contact with members of the 2nd 43rd battalion, whilst pursuing his civilian career with the education department.

Mac is at last freed from the last few months of pain that he suffered, and I am sure that all amateurs will join with me in extending sincere condolences to his widow Gwen, and their four children, Jim, Sue, Ian and Debbie.

Chris VK5PN
AR

DEADLINE

All copy for March AR must arrive at PO Box 300, Caulfield South, Vic 3162 at the latest by the 25th January 1984.

PLEASE NOTE: If you wish to advertise in the HAMADS column please write as legibly as possible, preferably type, on a reasonably sized sheet of paper. When sending ads for two sections, eg: For Sale and Wanted, please use two separate sheets of paper and include ALL details, eg: Name, Address, on both.

ELECTRONIC HOBBYIST!

DO YOU LIVE IN . . .
Ringwood, Lilydale,
Boronia, Wantirna,
Bayswater,
Mooroolbark etc? . . .

We carry a comprehensive range of electronic components at very keen prices.

Ian J. TRUSCOTT ELECTRONICS
CNR EASTFIELD & BAYSWATER ROADS, SOUTH CROYDON, VIC.
TELEPHONE (03) 723 3860

HAMADS

PLEASE NOTE: *If you are advertising items FOR SALE and WANTED please write on separate sheets, including ALL details, eg Name, Address, on both. Please write copy for your Hamad as clearly as possible, preferably typed.*

*** Please insert STD code with phone numbers when you advertise.**

- Eight lines free to all WIA members. $9 per 10 words minimum for non-members.
- Copy in typescript please or in block letters double spaced to PO Box 300, Caulfield South 3162.
- Repeats may be charged at full rates.
- QTHR means address is correct as set out in the WIA current Call Book.

Ordinary Hamads submitted from members who are deemed to be in the general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being resold for merchandising purposes.

TRADE HAMADS

Conditions for commercial advertising are as follows: The rate is $15 for four lines, plus $2 per line (or part thereof) minimum charge $15 pre-payable. Copy is required by the deadline as stated below indexes on page 1.

AMIDON FERROMAGNETIC CORES: Large range for all receiver and transmitter applications. For data and price list send 105 x 220 SASE TO: RJ & US IMPORTS, Box 157, Mortdale, NSW 2223. (No enquiries at office: 11 Macken Street, Oakley, 2223).

DOT MATRIX PRINTERS, Mannesmann Tally. Very high quality small business printers. 80 chr/s, 9 wire print head, dot addressable graphics, programmable print styles, adjustable sprocket and friction feed. Standard Centronics interface, RS-232-C optional. List price $595 + tax. Special price $505 inc tax + $15 insured shipping. Vic McDonald VK3ADQ, 84 Simpson Street, Warrnambool 3280. Ph: (055) 62 8448.

PACKET RADIO IS HERE. 1200 Baud. With error correction. Use your computer for QSOs, transfer blocks of memory or disk files. Programme written for Tandy Model 1 and 3 and System 80. Source code convertible for other Z80 computers. All this in "Synchronous packet using the software approach" by Robert Richardson. 220 Pages. $28.00 + $3.00 P&P. 2SSSD disks also available for $15.00 each postpaid. Circuits and boards available for simple MOD/DEMOD and computer interface unit. Some copies of the disassembled series in stock. Morse, RTTY and ASCII from your computer without costing a kilobuck. Northern Digital, PO Box 333, Charlestown, NSW 2290. Ph: (049) 43 8981.

WANTED — ACT

ICOM IC4541A 70 cm txcvr. Glen VK1KAA QTHR. Ph: (062) 54 8002.

WANTED — NSW

QE08/200 VALVE or equivalent type. Include phone call, postage etc in price. Rowland formerly VK2PJZ QTHR now VK2CRP. Ph: (066) 53 1027.

WANTED — VIC

HISTORICAL INFORMATION: Any details on MAK Ryan or his relatives. He was the Founding President of the Amateur Wireless Society of Victoria (now WIA) 1911-12. Contact Jim Linton VK3PR c/o VK3 Division.

KENWOOD TS130V details and price to VK3CCE QTHR. Ph: (03) 509 1720.

TH3JR BEAM in good condition. VK3LJ, A Solomon, Lot 24 McLennan Road, Clunes 3370. Ph: (053) 45 3465.

WANTED — QLD

HF MOBILE RIG must be in perfect cond with manual. Price and details to Mick VK4NGW. Ph: Brisbane only (07) 341 5039.

FOR SALE — ACT

ICOM IC551 6 m all mode 10 W txcvr with FM board. $475. Glen VK1KAA QTHR. Ph: (062) 54 8002.

FOR SALE — NSW

KENWOOD MC50 Mic $35. Yaesu FT101 Z-ZD. Service manual $20. All goods VGC. VK2PKB Ian Wilkinson QTHR. PH: (049) 32 8935.

KENWOOD TS430S, 0-30 MHz HF SSB, CW, AM, FM 100 W output txcvr with Kenwood MB430 mobile mount; SP-40 Kenwood mobile speaker, matching Kenwood PS-30 AC power supply. All brand new, in Kenwood cartons $1475. Ph: (02) 327 2981 or PO Box 505, Bondi Junction, 2022.

TS520 — CW filter, manual, handmike, excellent condition, unmarked, $380. VK2HZ QTHR. Ph: (047) 51 1724.

YAESU FT-ONE. Perfect condition CW inbuilt keyer, YM-35 scanning microphone, operating and technical manuals. $1400. VK2CAZ QTHR. Ph: (068) 82 2867.

YAESU FT-102 in very good working cond. 2 months use only. Oskerblock SWR-200 SWR/PWR meters. Handles 1.2 k. John VK2QY. Ph: (046) 33 8175.

FOR SALE — VIC

ATLAS 210X tcvr. GC compl with inst book. Match PS 220CS console. Mobile DMK mounting kit to suit above. All for $550 or offer. Neil VK3AQD QTHR. Ph: (03) 459 6445.

BEAM 3 el 14 MHz yagi. Werner Wulf. As new. All fittings, gamma match etc. Aluminox protected. Assembled. $150. VK3SZ QTHR. Ph: (03) 560 4305.

CHIRNSIDE 40 m 6'8" and Hustler 20 m whips. New bumper mnt. ⅜" 24 TPI $40. VK3FT. Ph: (03) 82 4853.

FT200 & POWER SUPPLY. Last model. Mic, valves and manuals, mint cond, low QSOs $340. VK3ALT QTHR. Ph: (03) 277 2337.

SWISS QUADS — 3 TET Swiss quad antennas, 10/15/20 m with aluminium alloy support mast. $650 the lot. Laurie VK3DPD QTHR. Ph: (03) 818 6009.

TELETYPE ASR33. ASCII computer terminal with service data, located Melbourne $175 ONO. Digi multimeter, Micronta 3 1/2 digit, 20 ranges as new $45. Vic VK3ADQ QTHR. Ph: (055) 62 8448.

FOR SALE — QLD

CHIRNSIDE CE35DX 5 el yagi for 10, 15 and 20 m. $285. Ph: (075) 43 5418.

DRAKE TR4C txcvr with AC4 PSU, RV4C ext VFO and 34 PNB noise blanker plus all spares and h'book. Orig cond, no mods $600. OBO VK4SY. Ph: (07) 393 0675.

KENWOOD TS-830S $950 ONO. 2 yrs moderate use. Ex cond with CW filter and service manuals. Charles VK4BPI QTHR. Ph: (079) 52 1675.

YAESU FRG-7700 Rx as new $380. Yaesu FRT-7700 antenna tuner $60. Yaesu FRV-7700 VHF converter $100. Telereader CWR-670 RTTY terminal (Rx only) very little use $395. Realistic AX-190 Rx $150. Realistic SX-190 Rx $150. Unica UP-3 shortwave preselector $20. Col VK4KOL QTHR. Ph: (07) 349 3412.

YAESU FT-220 all mode 2 m $220 ONO. 6 m, 100 W amp ben $120. Icom IC-22A 10 rpt, 4 simplex. $150. Kevin VK4ZKE. Ph: (07) 201 3006 AH or (07) 377 3785 BH.

FOR SALE — SA

AZDEN PCS-4000 computerised 2 m FM txcvr still under warranty. Has 8 MHz coverage, full scanning, 16 memories. In orig cart with scanning mic, all accessories and instr manual. $430 ONO. Ph: (08) 250 7259.

FOR SALE — WA

MAGAZINES — Back copes of EA, ETI, PE, EE and RE. Mostly recent issues. Back to 1980. Send SAE for list. Paul Catalano, 14 Lindy Way, Kelmscott 6111.

ANSWERS TRIAL EXAM AOCP

1	b	11	b	21	a	31	d	41	d
2	d	12	d	22	a	32	b	42	a
3	c	13	b	23	c	33	d	43	a
4	d	14	c	24	a	34	d	44	c
5	c	15	d	25	c	35	a	45	a
6	c	16	c	26	c	36	c	46	b
7	d	17	c	27	b	37	b	47	d
8	c	18	b	28	a	38	c	48	b
9	c	19	a	29	d	39	d	49	b
10	b	20	d	30	b	40	a	50	c

ADVERTISERS' INDEX

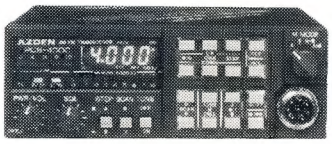
AMATEUR RADIO ACTION 4
ANDY'S RADIO REPAIR SHOP 41
BAIL ELECTRONIC SERVICES 5
CW ELECTRONICS 4
DICK SMITH ELECTRONICS ..... 28 & 29
EMTRONICS ..... IBC
GFS ELECTRONIC IMPORTS ..... 2 & 3
HIGH TECHNOLOGY COMPUTER SYSTEMS PTY LTD 51
HY-TECH DISTRIBUTORS 37
IAN J TRUSCOTT ELECTRONICS 55
ICOM AUSTRALIA PTY LTD ..... BC
K BRUCESMITH & G SCOTT 45
MICROWAVE DEVELOPMENTS 33
NOVICE LICENCE — VK2 41
TRAEGAR DISTRIBUTORS (NSW) PTY LTD ... 4
TRIO-KENWOOD (AUSTRALIA) PTY LTD ... IFC
VAINS ANTENNA SERVICES PTY LTD ... 15
WILLIAM WILLIS & CO PTY LTD 51
WILLIAMS PRINTING SERVICE PTY LTD 47

HAPPY NEW YEAR TO YOU!

AZDEN THE LEADER

PCS-300

The best hand-held on the market
only $359

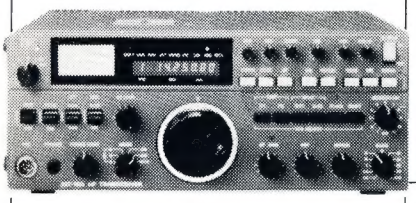


PCS-4000

The best mobile
only $475

NEW JST-100

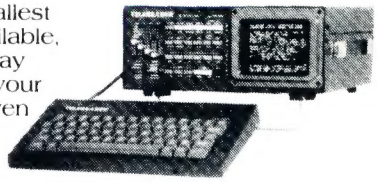
After you have seen everything else come and see the fantastic JST. New digitally synthesised micro-computer based transmitter/receiver with 11 channel memory, etc.



(Write for colour brochure.)
$1900

TELEREADER CWR-685E

Yes, now you can take it with you! The new CWR-685E TELEREADER is the smallest RTTY & CW terminal available, complete with CRT display screen. Stay active with your RTTY and CW friends, even while travelling.



Ring for special price

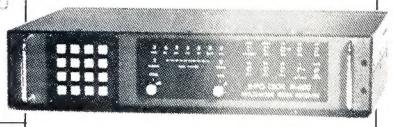
GO SSTV with the NEW ALINCO EC-720

Unique new SSTV converter.
only $799

Just arrived...

INFO-TECH M600A

A unique code receiver/converter—full specs available.

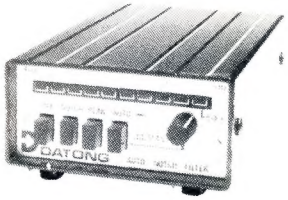


$1599 now $1390

DATONG SPECIALS!

SBR-2 WOODPECKER BLANKER
only $189

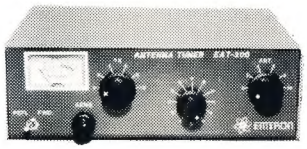
ANF, AUTO AUDIO NOTCH FILTER
only $169



FL-3 MULTI-MODE AUDIO FILTER
only $299

THE GREAT EMTRON EAT-300

The only continuous coverage tuner on the market.
only $159



Enormous success, covers all frequencies between 1.6-30 MHz continuously.

NEW STOCK HERE!! ENB-1 NOISE BRIDGE

only $89 incl battery
(+ $4 post)
First delivery sold out before release—if you would like to know more, write for specs. (Thanks for your many orders.)

SPECIAL ANNOUNCEMENT

To all computer owners!

We stock
KANTRONICS
Computer interface and software for CW, RTTY and ASCII. Convert your computer to a sophisticated communications terminal. Available for VIC-20, APPLE, TRS-80 & COMMODORE 64.

ANTENNA ROTATORS IN STOCK

KR400RC
KR600RC
KR2000RC
KR500
KR250
KS-050
stay bearing
8 core cable.

HF/VHF/UHF ANTENNAS IN STOCK

TRANSMISSION LINES

10D-2V 50 OHM LOW LOSS	$5 m
RG8AP 50 OHM	$3 m
7C-2V 75 OHM LOW LOSS	$3 m
450 OHM LADDER LINE	$29 100'

FILTERS

DRAKE		
TV-3300LP	$45	+ $4 Post
MONITOR TV HP	$33	+ $4 Post

VALVES

572B	$89	+ $4 Post
3-500Z	$199	+ $6.50 Post
4-1000A	$340	
6146B (RCA)	$26	+ $4 Post
6146W (RCA)	$35	+ $4 Post
6JS6C	$14	+ $4 Post
6KD6	$15	+ $4 Post
8950	$24	+ $4 Post
6LQ6/6JE6C	$15	+ $4 Post
6MJ6	$25	+ $4 Post
12BY7	$7	+ $2 Post
6GK6	$7	+ $2 Post
7360	$25	+ $4 Post

COAXIAL SWITCH

CS-401	$99	+ $6.50 Post
CS-201	$39	+ $6.50 Post
SA-450	$29	+ $6.50 Post
CH-20A	$40	+ $6.50 Post
CH-20N	$59	+ $6.50 Post

emtronics
PHONE: 211 0531

CORRESPONDENCE & MAIL ORDERS:
Box K21, Haymarket, NSW. 2000. Australia.
WRITE, PHONE OR CALL IN!

ICOM's IC-02A

Digital Readout, Scanning, Memories and...

ICOM introduces the new top-of-the-line IC-02A and IC-02AT to compliment its existing line of popular handheld transceivers and accessories. The new direct entry microprocessor controlled IC-02A is a full-featured 2 meter handheld.

Some of its many features are: Scanning, 10 memories, duplex offset storage in memory, odd offsets, 32 keyboard selectable PL tones which store in memory, and internal lithium battery backup.

Keyboard entry through the 16 button pad allows easy access of frequencies, duplex, memories, memory scan, priority, dial lock, PL tones and DTMF in the IC-02AT.

An easy-to-read custom LCD readout indicates frequency, memory channel, signal strength and transmitter output, PL tone, and scanning functions.

The new IC-02A has a battery lock, frequency lock, and lamp on/off switch. An aluminum case back is provided for superior heat sinking when the IC-02A is run at the standard 3 watt level or 5 watts (optional battery pack).

A variety of batteries will be available for the IC-02A including new long-life 8.4 volt and 13.2 volt packs. Charging may be done from a top panel connector for 13.8 volts which will also power transceiver operation.

ICOM's IC-2A(T) continues to be available...and its complete line of accessories work with the new IC-02A.

The IC-02A comes standard with BP3 NiCd battery pack, BC25U wall charger, flexible antenna, wrist strap and belt clip.

Discover a new deal with
ICOM AUSTRALIA PTY. LTD.

7 DUKE STREET WINDSOR 3181
VICTORIA, AUSTRALIA
TEL: (03) 529 7582 TLX: AA 35521 ICOMAS

ICOM
The World System

WARNING: When purchasing an ICOM unit, please confirm that you are dealing with an **Authorised ICOM Dealer**, as the ICOM Warranty applies **only** to units supplied by ICOM Australia Pty. Ltd., to Authorised ICOM Dealers. **All stated specifications are approximate and subject to change without notice or obligation.** Adgroup ICM639